





INSTRUMENT DIVISION

ADDENDUM

The VP2-100 S6498A Power Supply is similar to the VP5-135MOV as described in the enclosed manual with Special Modification S6498A added.

Special Modification S6498A consists of:

1. Input Volts to: 208,220,230 and 235 Vac $\pm 10\%$, @50/60 Hz.
2. Temperature Range: 25 - 50°C.
3. Output Volts: 1.9 - 2.5 volts. Set to 2.0 volts.
4. Output Current: 100A.
5. Overvoltage set to: 3.5V ± 0.2 V.
6. Overload Protection set to: 110A ± 0.1 A.
7. Special Parts List 065118.
8. See Schematic 065135 for complete circuit description.

The VP2-100S6498 Power Supply is similar to the VP5-135MOV as described in the enclosed manual with Special Modification S6498 added.

Special Modification S6498 consist of:

Input Volts to: 208,220,230 and 235 Vac $\pm 10\%$ @50/60 Hz.
Temp. Range: 25-50°C.
Output Volts: 1.9-2.5 volts. Set to 2.0 volts.
Output Current: 100A.
Overvoltage set to: 3.5V ± 0.2 V.
Overload Protection set to: 110A ± 0.1 A.
See Schematic D065135.
Change T101 part number to 504289.
Add TB4 (rear panel) new part number 850064 with voltage markings on taps.
Change CB101 to 15A part number 760107.
Change Q104 thru Q130 part number to 700088.
Change M102 part number to 06503002 with jumper across +S & -S.
Add C113, 0.1 μ F 500V part number 106416.
Change R101,102 to 0.1 Ω 5W part number 630018.
Change R1 to 220 Ω 5%, 2W part number 106039.
Change R3 to 500 Ω Variable part number 600133.
Change R4 to 3.01 k 1% part number 620480.
Change R5 to 2.55 k 1% part number 620462.
Change R12 to 390 Ω 5%, 1/2W part number 101476.
Change R13 to 750 Ω 5%, 1/2W part number 101496.
Change R19 to 10 Ω 5W part number 640210.
Change CR8 to 1N4384 part number 720384.
Delete CR5.
Add CR14 & 15, 1N4151 part number 100385.
Add Q2, 2N3643 part number 101385.
Add R33, 270 Ω 5%, 1/2W part number 101485.
Add R34, 4.7 k 5%, 1/2W part number 101511.

* - DEVIATION FROM STANDARD VP5-135 MOV

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY ACT. QTY	ISS. CODE	SHT QTY
1	065118	SHIPPING ASSY		XX		
3D		SCHEMATIC	D-065135	1	R	*
4		SPECIAL TEST DATA	A-1282	1	R	*
6A	PD27481	FRONT PANEL ASSY		1	2	
7D	065656	" " FINISH		1	2	
8B	06503002	METER ASSY 3V	M1102	1	2	*
9B	06502501	METER MVMT 1mA 77Ω		1	1	
10	11171114	DIAL BLANK	B-065030	1	1	
11B	0650481	PC 3D (MULTIPLIER)		1	2	
12	1117120	POT. 1T W.W. 500Ω	R401	1	1	
13	106232	RES. 2.67KΩ	R402	1	1	
14	103862	HEX NUT		2	1	
15A	06508101	METER ASSY 150A	M1101	1	2	
16B	06502501	METER MVMT 1mA 77Ω		1	1	
17	11171114	DIAL BLANK	B-065081	1	1	
18	08E420	NAME-PLATE		1	1	
19	600140	POT. 500Ω-2W	R133	1	1	
20	116650	CIRCUIT BRKR 15A	C1101	1	1	
21	770020	PILOT LAMP	DS1101	1	1	
22	840220	SHAFT LOCK		1	1	
23	T920190	TIP JACK BLACK		1	1	
24	T920260	" " RED		1	1	
25	T920258	" " WHITE		1	1	
26	T920010	HANDLES		2	1	
27	106416	CAP. 1μf-600V	C1113	1	1	
28		FRONT PANEL WIRING	PD28261	1	R	
29						

REVISIONS DESCRIPTION	MODEL	JCR NO.	LOT QTY	LOT NO.	CODE IDENT
					52542
	PLANNER	PREP	DATE	SYSTRON CORPORATION	
	CHK'D	SHIPPING ASSY			
	MAT. QTY	VP 2-100 MOV			
	APPRO	S6498			
	REV REQ	DRAWING NO.			
		PART NO.			
		065118			
		1 25 7			

*-DEVIATION FROM STANDARD YPS-135-MOV

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ACT QTY	STOCK QTY
34B	PD27482	MAIN CHASSIS ASSY		1	2	
35C	065145	"		1	2	
36A	504289	TRANSFORMER	T101	1	2	
37	504080	C-OKE	L 01	1	2	
38	106664	FAN	B101	1	1	
39C	T111894	SHROUD		1	2	
40	102776	4-40 X 3/8 NYLON SCREWS		2	R	
41	T900111	CAP BRKT		1	1	
42C	T109932	INSULATOR PLATE		1	2	
43	T990400	NYLON NUT		3	R	
44	840192	RUBBER FEET		4	1	
45C	T109902	BUSS		1	2	
46C	T109462	" (POS. OUTPUT)		1	2	
47C	T109452	" (NEG. OUTPUT)		1	2	
48C	T111852	" (DIODE POS)		1	2	
49C	T112322	SHUNT	R134	1	2	
50	117333	P.C. BOARD SUPPORT		4	1	
51D	T109272	CAP. CLAMP		1	2	
52	820419	CAP. 42,000 μ f-25V	C105 106	6	1	
53		S/A C105	107, 108		P	
54		S/A C105	109, 110		R	
55	800304	1 μ f-250V	C104	1	1	
56	800325	2.2 μ f-250V	C103	1	1	
57	820359	17,500 μ f-20V	C112	1	1	
58						
59						
60	057020	BRACKET BLOWER		2	1	
61						
62						
63						
64E	PD28284	SUB-CHASSIS ASSY		1	2	
65D	T109942	"		1	2	
66B	T100712	CAP. CLAMP		1	1	

DIVISION DESCRIPTION	MODEL	JOB NO.	LOT QTY	LOT NO.	CODE	DEPT
	PLANNER	PREP	DATE	SYSTRON	CON	CONNER
	CHK'D	SHIPPING ASSY				
	MAT. DUE	APPRO	YP 2-100 MOV			
	BURIED	S6498				
	DRAWING NO.					
	065118					
	2 7					

*- DEVIATION FROM STANDARD VP5-135-MOV

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY ACT. QTY	ISS. QTY	QTY
		SUB-CHASSIS ASSY (CONT.)		XX		
68	820403	CAP 35,000 μ f-20V	C1111	1	1	
69	860055	CERAMIC STANDOFF		2	1	
70	T900003	ANGLE BRACKET		2	1	
71	T990405	NYLON NUT		4	R	
72						
73	T109862	BUSS EMITTER CONN.		1	2	
74						
75						
79B	PD27477	HEATSINK ASS'Y #1		1	2	
80D	T109912	HEATSINK		1	2	
81C	T109882	BUSS		1	2	
82	700088	TRANSISTOR, 2N6258	Q119-130	12	1	
83					R	
84					R	
85					R	
86	830101	TRANSISTOR SOCKET		12	1	
87	630018	RES. .12-5W-3%	R119-130	12	1	
88					R	
89					R	
90					R	
91	T990405	NYLON NUT		1	R	
92		HEATSINK #1 WIRING	PD23742	1	R	
96B	PD27478	HEATSINK ASS'Y #2		1	2	
97D	T109912	HEATSINK		1	2	
98C	T109882	BUSS		1	2	
99	830101	TRANSISTOR SOCKET		11	1	

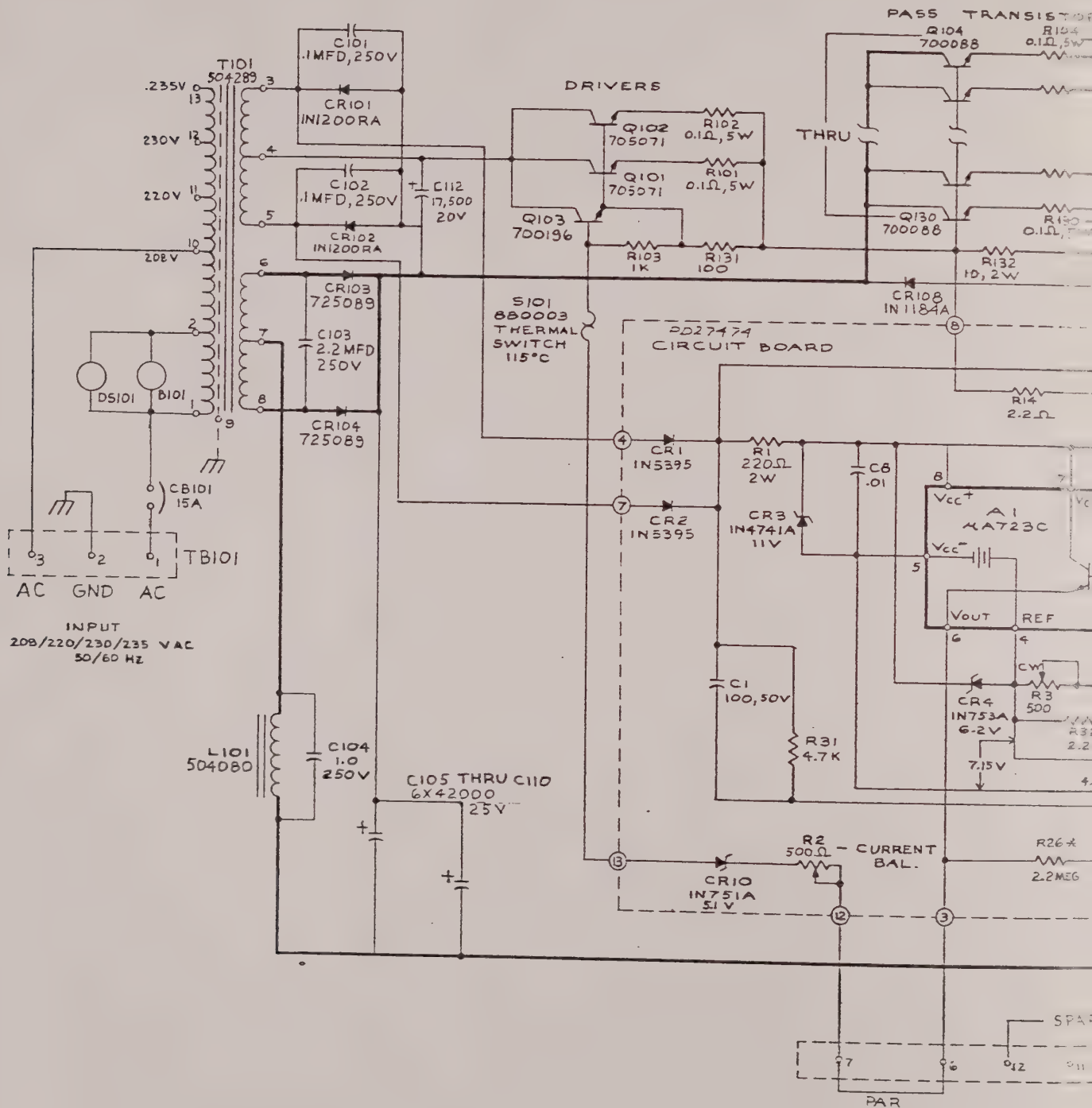
REVISIONS DESCRIPTION	MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT.
					52542
	PLANNER	PREP	DATE	SYSTRON  DONNER	
		CHK'D		CORPORATION	
	MAT. DUE	APPRO		SHIPPING ASS'Y VP 2-100 MOV S6498	
	3.0 REQ.			DRAWING NO. 065118	
				REV	

* - DEVIATION FROM STANDARD VPS-135-MOV

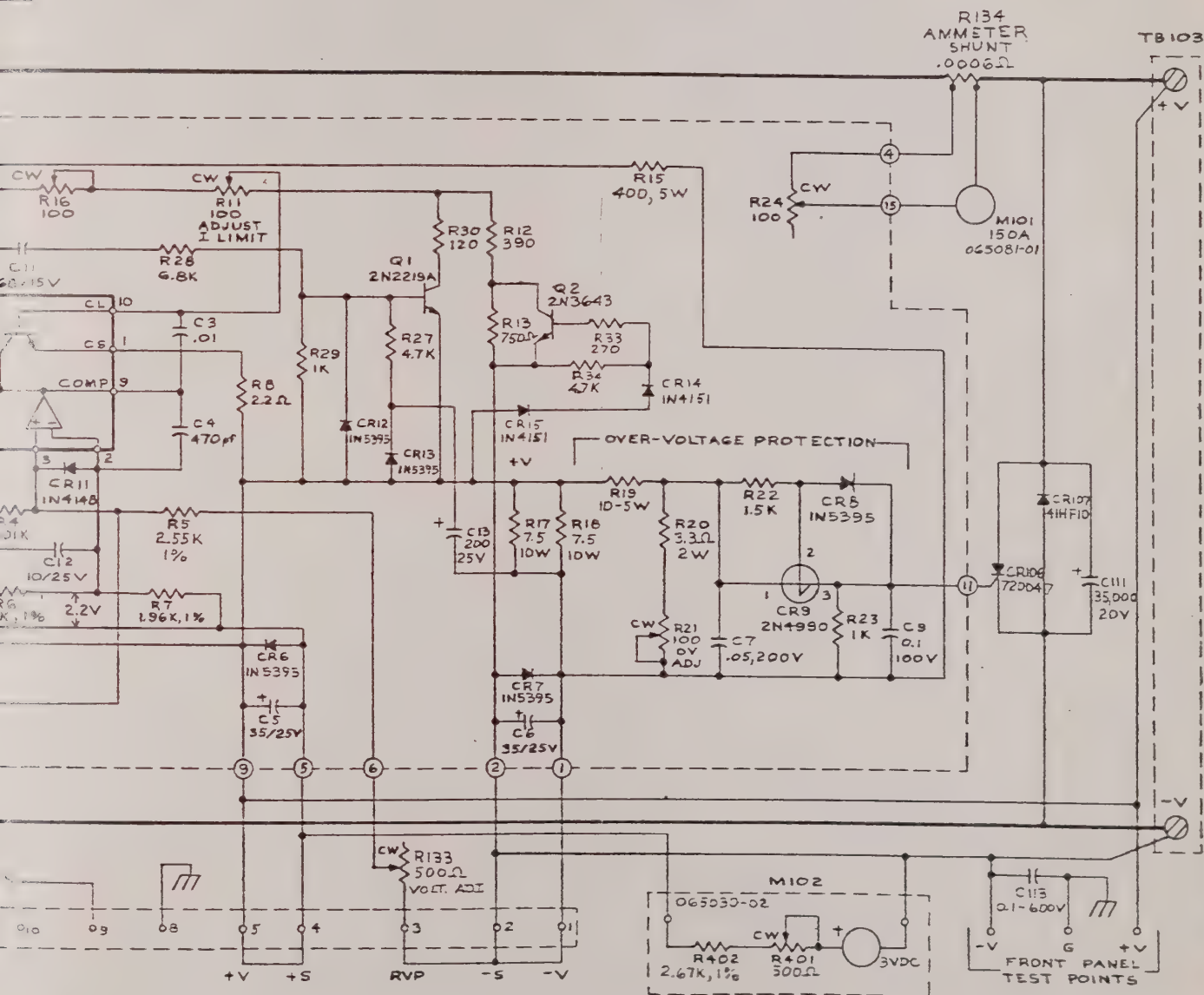
ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY ACT. SS. DHT. CTY. CODES	CTY.
		PC BOARD ASSY (CONT)		XX	
200	101508	RES. 120 Ω - $\frac{1}{2}$ W	R30	1 1	*
201	101454	2.2K- $\frac{1}{2}$ W	R32	1 1	
202	101467	1K- $\frac{1}{2}$ W	R23, 29	2 1	
203	101511	4.7K- $\frac{1}{2}$ W	R27, 31, 34	3 1	*
204	101510	6.8K- $\frac{1}{2}$ W	R28	1 1	
205	620402	1.96K- $\frac{1}{2}$ W-1%	R7	1 1	
206	620480	3.01K- $\frac{1}{2}$ W-1%	R4	1 1	*
207	620462	2.55K- $\frac{1}{2}$ W-1%	R5	1 1	*
208	620534	4.64K- $\frac{1}{2}$ W-1%	R6	1 1	
209	640182	7.5 Ω -10W-10%	R17, 18	2 1	
210	640210	10 Ω -5W	R19	1 1	*
211	640140	3.3 Ω -2W	R20	1 1	
212	101459	1.5K- $\frac{1}{2}$ W-5%	R22	1 1	
213	106039	220 Ω -2W	R1	1 1	*
214	101496	750 Ω - $\frac{1}{2}$ W-5%	R13	1 1	*
215	640434	400 Ω -5W	R15	1 1	
216	611100	2.2M- $\frac{1}{2}$ W-10%	R26	1 1	
217	101485	270 Ω - $\frac{1}{2}$ W-5%	R33	1 1	*
218	T942441	AC-DC HARNESS		1 2	
219	PD27475	" " " LIST		R	
220	SP527A	" " " LAYOUT		R	
222	PD24411	JUMPER LIST		1 2	
224		FAN WIRING	PD23747	1 R	
225		XFORMER WIRING	PD27483	1 R	
		CHOKE WIRING	PD23746	1 R	
227	PD23753	TOP COVER ASSY		1 2	
228	T115384	" "		1 2	

REVISIONS
DESCRIPTION

MODEL	JOB NO.	EST. CTY.	EST. NO.	EST. DENT
				50542
PLANNER	PREP	DATE	SYNCHRON	ENTER
				CORPORATION
	CHK'D		SHIPPING ASSY	
MAT. DUE	APPD		VP 2-100MOV	
			S6498	
SU REL			DRAWING NO.	
			REVISIONS	
			P 065118	
			7 7	



REF ID: A66536					
NO.	DESCRIPTION	REL. NO.	SEC. NO.	DATE	AMOUNT
A	DELETED TB104			5-7-78	AS
B	CR108 WAS P/N 720488			6-11-78	AS
D1	W5395'S WERE WASHED, TB108 ON 6-12-78. (W. MATHS AC.)	-	NFC	8-2-85	AS



ITEM NO.	QTY	PART NUMBER	DESCRIPTION	SCHEMATIC DET. NO.

DRAWN BY: <u>W. B. BROWN</u> DATE: <u>7-1-68</u>		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMAL TOLERANCE .001 .002 .003 .004 .005 .006 .007 .008 .009 .010	SYSTEM DONNER CORPORATION CONCORD, CALIFORNIA		MODEL VD2-00 36495	
CHECKED BY: <u>ATE</u>	DATE: <u>7-1-68</u>					
DESIGNED BY: <u>ATE</u>	DATE: <u>7-1-68</u>					
MATERIAL: <u>DATE</u>	DATE: <u>7-1-68</u>					
PROJECT: <u>DATE</u>	DATE: <u>7-1-68</u>					
QA: <u>DATE</u>	DATE: <u>7-1-68</u>					
LISTED ON: <u>NEXT ASSY:</u>		SCALE: <u>DATE:</u>	DO NOT SCALE DRAWING	MATERIAL: <u>DATE:</u>		DRAWING NO. REV: 11
APPLICATION: <u>DATE:</u>		SCALE: <u>DATE:</u>		PART NO. 06513		REV: 11

Shall not be either released outside the Government or used, disclosed or disclosed in whole or in part for manufacture or procurement without the written permission of Secretary-Deputy Commander except for: (1) emergency matter or essential work by or for the Government, where the time or process concerned is not otherwise reasonably practicable; (2) studies relating to performance of the work, or (3) response to a foreign government, as the interests of the United States are thereby promoted; that in either case the release, use, disclosure or disclosure shall be subject to the foregoing limitations. The release shall be marked on any reproduction in whole or in part.

INSTRUMENT DIVISION

**VALUPOWER
SUPPLIES**

DOCUMENT NO. 120026-01

OPERATING AND SERVICE MANUAL



**SYSTRON
DONNER**
INSTRUMENT DIVISION

SYSTRON DONNER
INSTRUMENT DIVISION
2727 Systron Drive
Concord, California 94518
WARRANTY POLICY

I Warranty

Systron Donner Instrument Division warrants that at the time of shipment the products manufactured by Systron Donner and sold hereunder will be free from defects in material and workmanship and will conform to the current specifications published by Systron Donner's Instrument Division.

II Warranty

- A The warranty period will be one year from the date of shipment. This warranty is extended only to the original buyer.**

III Warranty Adjustments

- A. If any defect within this warranty appears, Purchaser shall notify Seller immediately.**
- B Systron Donner agrees to repair or furnish a replacement for, but not install, any product which within the standard warranty shall, upon test and examination by Systron Donner, prove defective within the above warranty period.**
- C No product will be accepted for return or replacement without prior approval of Systron Donner. Upon such authorization and in accordance with instructions of Systron Donner, the product will be returned to the manufacturing location, shipping charges prepaid by Purchaser.**

IV Exclusions from Warranty

- A The foregoing warranty is in lieu of and excludes all other expressed or implied warranties of merchantability or fitness or otherwise.**
- B Systron Donner will not be liable for any special or consequential damages or for loss, damages or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with any other equipment or material, or from any other cause.**
- C The warranty does not extend to any product manufactured by Systron Donner which has been subjected to misuse, neglect, accident, improper installation or to use in violation of instructions furnished by Systron Donner.**
- D The warranty does not extend to or apply to any unit which has been repaired or altered at any place other than Systron Donner; by persons not expressly approved by Systron Donner; not to any unit, the serial number of which has been removed or defaced or Changed.**
- E This warranty applies to new equipment only and will cover repaired or replacement items only to the extent of the balance remaining of the items original warranty period noted in Paragraph II.**
- F All freight charges will be paid for by the Purchaser.**

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CHAPTER 1

DESCRIPTION

1.1 INTRODUCTION

The ValuPower Series power supplies are a flexible and dependable sources of DC power, which can be used to meet a variety of needs. These needs may range in scope from inspection and production testing, to laboratory bench testing, IC and systems applications.

The voltage adjustment range makes these units well suited for specific systems applications. The ability to provide power packaged in minimum space with high reliability and performance meets the demands of most system requirements.

This instruction manual provides general characteristics and specifications, operating procedures, theory of operation, maintenance and calibration, parts lists and related schematics for the ValuPower Series power supplies.

1.2 GENERAL FEATURES

Adjustable current limiting, low noise for IC and Systems applications, slot voltage modes, current to 300 amps, positive connection cooling, automatic load short paralleling, remote sensing and programming, extremely low output impedance, overvoltage protection, UL design standards and no turn on/turn off transients are featured in the ValuPower Series power supplies. Output, Sensing, Automatic "Load Share" paralleling and Remote programming terminals are located on a barrier strip mounted on the rear panel of the unit. The AC power switch, AC pilot lamp, voltage control, and appropriate optional metering devices are all located on the front panel.

1.2.1 Constant Voltage Mode

A constant voltage is maintained across the output terminals at any preset value within the rated slot voltage range, provided that the load does not draw any more than either the rated output current or more than the preset limiting current value determined by the top recessed current control setting.

1.2.2 Automatic Foldback Current Limiting

Short circuit protection is provided by the automatic current limiting circuit which limits the max-

imum output current under all load conditions. The point at which automatic current limiting occurs is variable and may be selected anywhere between 40% of the rated output current and maximum rated output current of the unit. In the event of an overload, the current and voltage foldback into a safe operating region. In the event of a short circuit, the output current is limited to approximately 40% of the rated current.

1.2.3 Remote Programming

Remote programming is provided in the voltage mode of operation and may be utilized over the entire voltage range of the unit. The scale factor for remote voltage programming is approximately 500 ohms per volt.

1.2.4 Automatic "Load Share" Paralleling

Automatic "Load Share" paralleling permits interconnection of up to four supplies so that each supply is parallel and delivers an equal amount of current to the load, with single knob voltage control of all units.

Adjustable overvoltage (OV) protection is standard on all the ValuPower Series power supplies. This protection provides special circuitry to prevent the output from exceeding a preset voltage. An external adjustment control recessed in the top cover is provided to vary the point at which the OV circuit will activate. The overvoltage crowbar will latch when an overvoltage condition occurs and must be reset by cycling the AC input power off and on again. The OV Protection point should not be set lower than one (1) volt above the minimum power supply voltage rating or 5.5V minimum.

1.3 PRECAUTIONARY MEASURES

1.3.1 Wire Size

To assure proper regulation under all load conditions and to prevent severe distortions of the AC line voltage, it is very important to take into consideration the physical size and current handling capabilities of the input power line. Serious losses in regulation and an increase in ripple may result from underrated or overloaded AC input lines.

The maximum AC impedance from the breaker box to the power supply should not exceed 0.5 ohms.

1.3.2 Systems Considerations

In systems applications it is recommended that each power supply input power line be run separately to the AC distribution box in order to minimize cross coupling and interaction between equipment. Do not run sensitive signal leads such as the remote sensing leads in the same cable as the AC input without shielding. To keep the AC ripple in the output to a minimum, it is recommended that the AC input cables should not be run in close proximity to the output load cables.

1.3.3 Terminal Post Resistance

All terminals and shorting links serving outputs, sensing and programming must be securely tightened before use. Serious loss of regulation and an increase in ripple can result due to a voltage drop caused by loose terminals and shorting links.

The specifications cited herein for regulation and ripple can be readily attained on every power supply providing the proper method of measurement is employed. The major consideration is that the highly stable meter and oscilloscope, specified in the calibration procedures, must be connected to the sensing terminals and not the load terminals. The reason for this precaution is that the voltage drop between the load terminals and sensing terminals will yield an inaccurate regulation ripple measure.

1.4 SPECIFICATIONS

Table 1-1 is a complete list of standard specifications for the ValuPower Series power supplies.

TABLE 1-1 SPECIFICATIONS

ELECTRICAL SPECIFICATIONS	
Input:	105-132 VAC ² , 57-65 Hz (200-250 VAC, 47-65 Hz optional available ³) VPL units are standard 208/220 VAC single phase $\pm 10\%$.
Output:	Floating; Isolated from ground 300 VDC maximum. Internal protection is provided for applied reverse voltage.

TABLE 1-1 SPECIFICATIONS (Cont'd)

ELECTRICAL SPECIFICATIONS (Cont'd)	
Regulation Line:	$\pm 0.02\%$ or 5 mV ¹ , for full range line change.
Regulation Load:	0.05% of 5 mV ¹ , for no load to full load.
Ripple:	Less than 1 mV RMS; total ripple and noise less than 5 mV p-p or 0.05% ¹ to 10 MHz.
Stability:	0.05% or 10 mV ¹ , for 8 hours after 30 minute warm-up. Measured at constant line, load and ambient temperature.
Temperature Coefficient (Per °C):	0.05%.
Temperature Range:	-20°C to +71°C.
Temperature Storage:	-55°C to +85°C.
Recovery Time:	50 mS to within 30 mV for a $\Delta 1$ change as shown in the table.
Overload Protection:	Automatic Electronic Current Foldback with instantaneous automatic reset. Adjustable from 40% to 100% of rated load. (A minimum short circuit current of 10% will be delivered into any class of load, ensuring proper operation with most non-linear loads). All models have thermostatic thermal protection.
AC Power Input Protection:	Front panel circuit breaker.
Remote Programming:	Programmable over rated voltage range. Scale factor approximately 500 ohms/volt.
Voltage Adjustment Range:	Continuously adjustable over rated voltage range. Resolution and settability 0.1%.
REmote Sett	Maintains rated regulation directly at the load. Maximum line drop 0.5V per leg is included in voltage range. Internal protection is supplied for open sensing leads.
Paralleling:	Automatic Load share paralleling with single knob control of up to four units.

TABLE 1-1 SPECIFICATIONS (Cont'd)

ELECTRICAL SPECIFICATIONS (Cont'd)

UL Approval: Designed to meet UL Regog-nized Component Index requirement.

GENERAL & PHYSICAL SPECIFICATIONS

Design Principle: Precision Series Pass Regulation.

Operational Modes: Constant Voltage with Auto-matic Current Foldback Pro-tections.

Controls

Voltage: Continuous voltage adjustment, front panel screwdriver locking adjust.

Current: Top recessed adjustment, 40% to 100%.

Input Power: Front panel AC ON switch and power indicator.

Current Balance: Top recessed adjustment for auto load-share paralleling.

OV Adjust: Top recessed adjustment potentiometer.

Metering (Option):

Voltage: Front Panel Voltmeter (meter accuracy $\pm 2\%$).

Current: Front Panel Ammeter (meter accuracy $\pm 2\%$).

Rear Panel Power Output Terminals: TB-3 3-8/16 heavy duty terminals for +V and -V.

Rear Panel Power Protection: Automatic fast acting, adjust-able overvoltage protection with recessed adjustment.

TABLE 1-1 SPECIFICATIONS (Cont'd)

GENERAL & PHYSICAL SPECIFICATIONS (Cont'd)

Rear Panel Barrier Strip: TB-1 (1) AC; (2) Ground; (3) AC. TB-2 (1) Negative Output -V; (2) Netative Sensing -S; (3) Remote Voltage Program-ming RVP; (4) Positive Sens-ing +S; (5) Positive Output +V; (6-7) Paralleling PAR; (8-12) Spares.

Universal Slide: Integral provisions are made for rapid mounting of commonly specified centerline mounting slide assemblies (in-line screw centers). Typical slide assem-blies are Emcor series 20, Grant series 4435 and Jonathan series 120 qd.

To utilize slides, add snap-in mounting nuts Tinnerman type C7941-832B (8-32"). C7941-1032-3B (10-32"). When ordering specify nut size and positioning per outline drawing. No charge for factory installation.

Dimensions: (VP) 5-1/4" x 19" (EIA) x 18-1/8" (VPL) 8-3/4 x 19" (EIA) x 22.

Weight: (VP) 85 lbs. (VPL) 120 lbs.

NOTES:

¹ Whichever is greater.

² Derate output current 15% for operation above 125 VAC (or 238 VAC).

³ Derate current 10% or temperature 10°C. Multiply ripple by 2x factor.

CHAPTER 2

INSTALLATION AND OPERATION

2.1 MECHANICAL INSTALLATION

When the ValuPower series power supply is used in a rack or bench type configuration, no special mechanical installation is required. However, integral slide mount provisions are made for rapid mounting of commonly specified centerline mounting, slide assemblies (in line screw centers).

2.2 ELECTRICAL CONNECTIONS

2.2.1 Input Power

A three-terminal for VP series and four terminal for VPL series barrier strip mounted on the rear panel provides AC input connections to the unit.

The power handling ability of the AC power lines feeding AC power to the unit must be considered, as serious losses in regulation and substantial increase in ripple may occur as a result of insufficient power capacity of these lines. All AC power line connections must be securely tightened and any movable electric contact surface (such as the wiper arm of a variable transformer) should be kept clear of impedance producing oxide coatings.

Care should be exercised in selecting the proper wire size for the AC input lines. The AC wire size should be sufficient so that the line drop does not exceed a value which will allow the input voltage to drop below the specified lower limit.

An AWG #14 should be adequate for most short runs of 20 ft. or less. Increase wire size to #12 for up to 50 feet and to #10 for up to 100 feet.

2.2.2 Rear Panel Output

Barrier strips mounted on the rear panel provide sensing, programming, automatic "Load Share" paralleling and ground connections. A heavy duty block containing two (2) stud type terminals is provided for output connections.

2.2.3 Front Panel Output

Three insulated tip jacks mounted on the front panel provide output and ground connections. These terminals are provided for test convenience

purposes, and for easy monitoring of the output. They should not be used to draw Load Current. To achieve optimum regulation, load current must be extracted from the output block mounted on the rear panel.

2.3 OPERATING CONFIGURATIONS

The ValuPower series power supplies are designed to operate as highly regulated constant voltage sources with automatic foldback current limiting. There are various operating configurations that can be used by proper application of shorting links and wiring. The following paragraphs describe the various operating configurations and their connections.

2.3.1 Local Voltage Programming

To adjust the output voltages from the power supply, connect a shorting link across terminals -S and RVP. With this shorting link installed, the voltage adjust control provides adjustment of the output over the rated slot voltage range. (Refer to Figure 2-1 and 2-1A).

2.3.2 Remote Voltage Programming

Remote voltage programming is achieved by removing the shorting link from terminals -S and RVP and substituting a resistive element of proper value across terminals -S and RVP external to the power supply. (Refer to Figures 2-2 and 2-2A.)

2.3.3 Local Sensing

Local sensing connections are made when rated regulation is not required directly at a remote load.

Connect the load to output studs +V and -V and ascertain that shorting links are connected between terminals -V and -S and +S and +V. (Refer to Figures 2-1 and 2-1A.)

2.3.4 Remote Sensing

Remote sensing is used when rated regulation is required at a remote load.

Remove the shorting links between terminals -V and -S and +S and +V. Using a twisted, shielded

pair of wires, connect the -S and +S sensing terminals to the load. To prevent damage to the power supply, correct polarity of both the remote sensing and output leads must be observed. The negative remote sensing lead -S and negative output lead -V must be connected to one side of the load and the positive remote sensing lead +S and positive output lead +V connected to the other side of the load. The shield should be grounded at the power supply end of the cable.

2.4 CONTROLS

Front Panel

AC ON	Circuit breaker controls power.
Voltage Adjust	Potentiometer, adjusts voltage output.

Top Cover (Recessed Controls)

Current Limit	Potentiometer adjust current limiting point.
Current Balance	Potentiometer adjusts load sharing in parallel use.
OV Adjust	Potentiometer adjust overvoltage protection point in units having this optional feature.

2.4.1 Internal

All internal control settings have been factory pre-set and require no additional adjusting. However, if it should become necessary to adjust any of the internal controls due to circuit changes caused by component aging or replacement, refer to the calibration section of this manual.

2.5 OPERATION

Control Settings: Set front panel control fully CCW, top recessed controls fully CW.

Shorting Lins: Prior to the application of power, connect all loads, external wiring and shorting links required for the mode of operation desired.

Grounding: Either side of the output may be grounded, or the output may be used in a floating condition.

Power On: Connect the unit to a nominal AC input power source. Set AC power switch to on, and observe that pilot lamp is lit.

Warm Up: No warm up time is necessary to place the unit into operation. However, a 30-minute warm up period is recommended to reach rated stability. The unit is now ready for operation.

2.6 AUTOMATIC LOAD SHARE PARALLELING

2.6.1 General

To operate two or more power supplies in the automatic load share paralleling mode, select one unit as a master and the other units as slaves. Set the front panel control on the slaves fully CW and disconnect the jumper between terminals 6 and 7 on TB2, (3 and 4 on TB104). With the jumper on the master connected between terminals 6 and 7 on TB2 (3 and 4 on TB104), connect terminal 7 on TB2, (4 on TB104) on the master to terminal 7 on TB2, (4 on TB104) on all the slaves.

Use leads of approximately equal resistance for connecting load to +V terminals, or strap +V terminals directly together if near each other and use a single load from the master terminals.

Remote sensing need only be done with the master terminals. Remove jumpers from between terminals -V and -S and terminals +S and +V on master and run leads from -S to - side of lead and from +S to + side of lead. Leave jumpers in place on slave units.

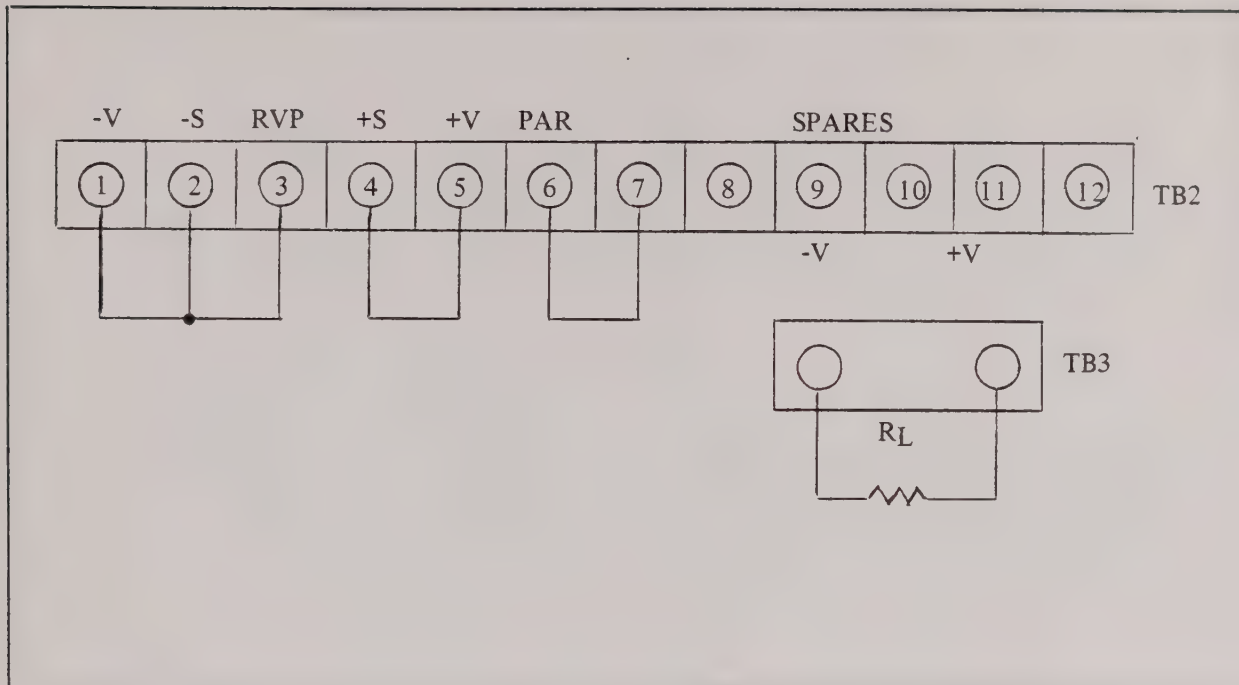


FIGURE 2-1 LOCAL PROGRAM - LOCAL SENSE VP SERIES CONNECTION

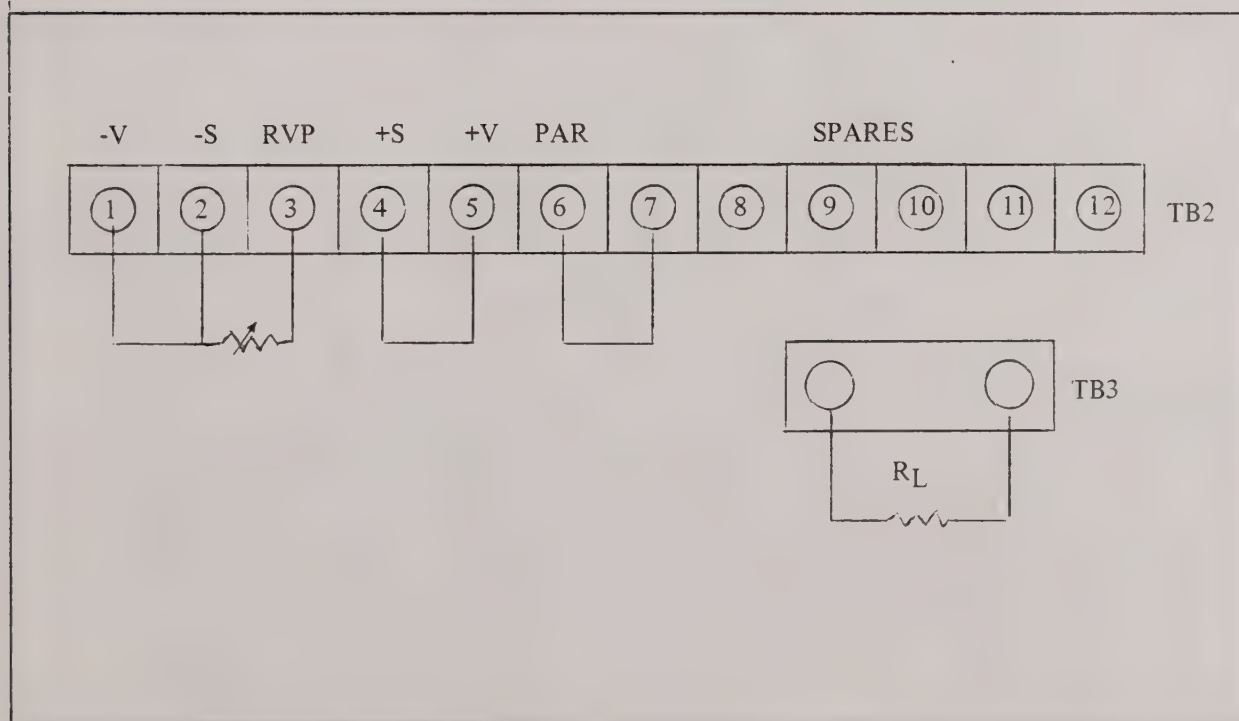


FIGURE 2-2 REMOTE PROGRAM VP SERIES CONNECTION

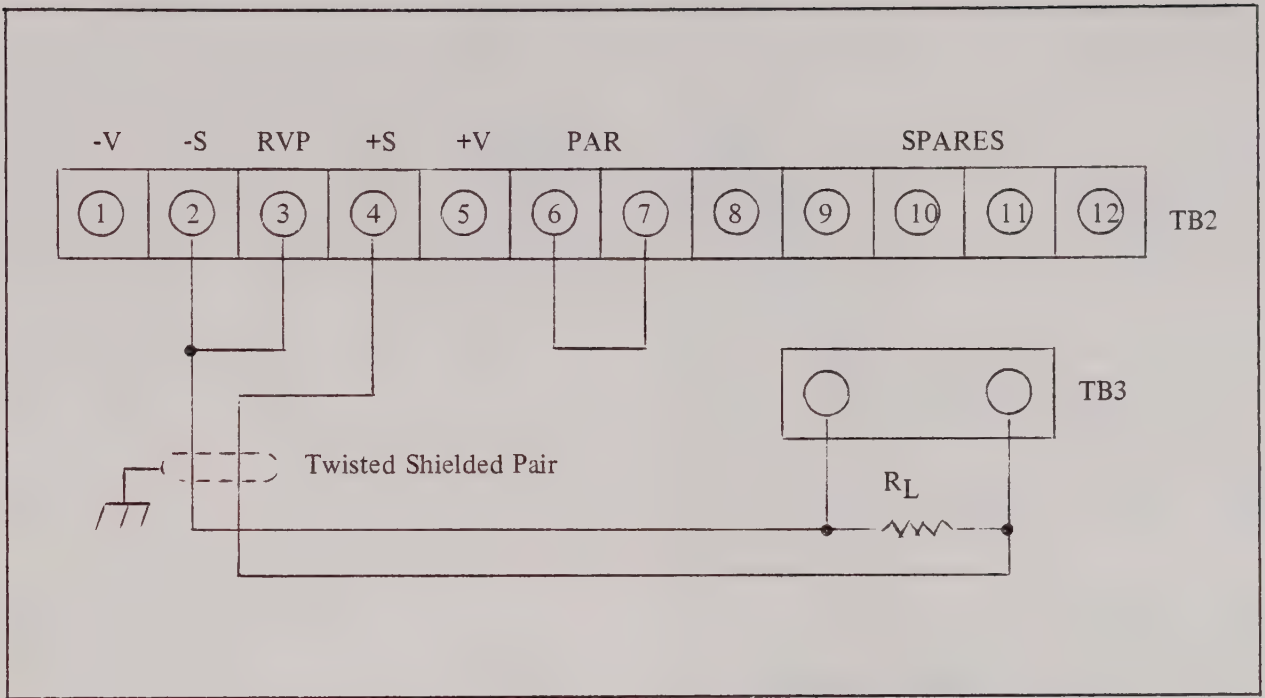


FIGURE 2-3 REMOTE SENSE VP SERIES CONNECTION

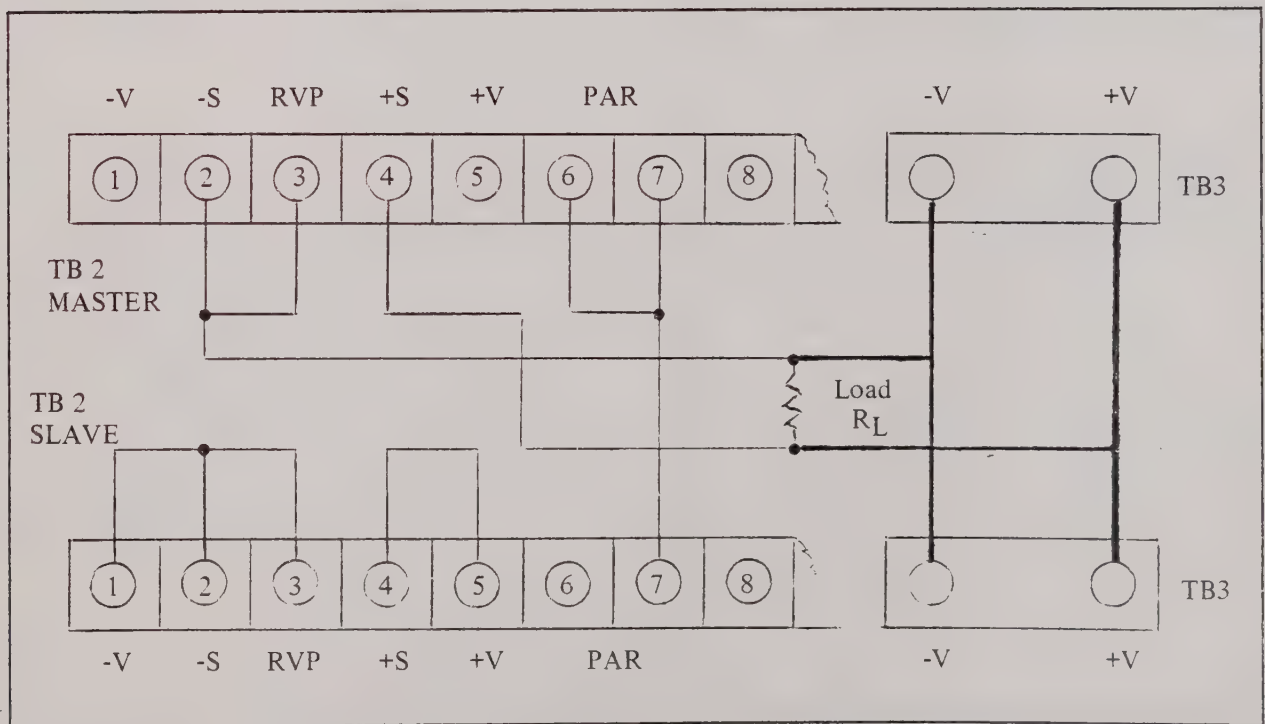


FIGURE 2-4 AUTO PARALLEL VP SERIES CONNECTION

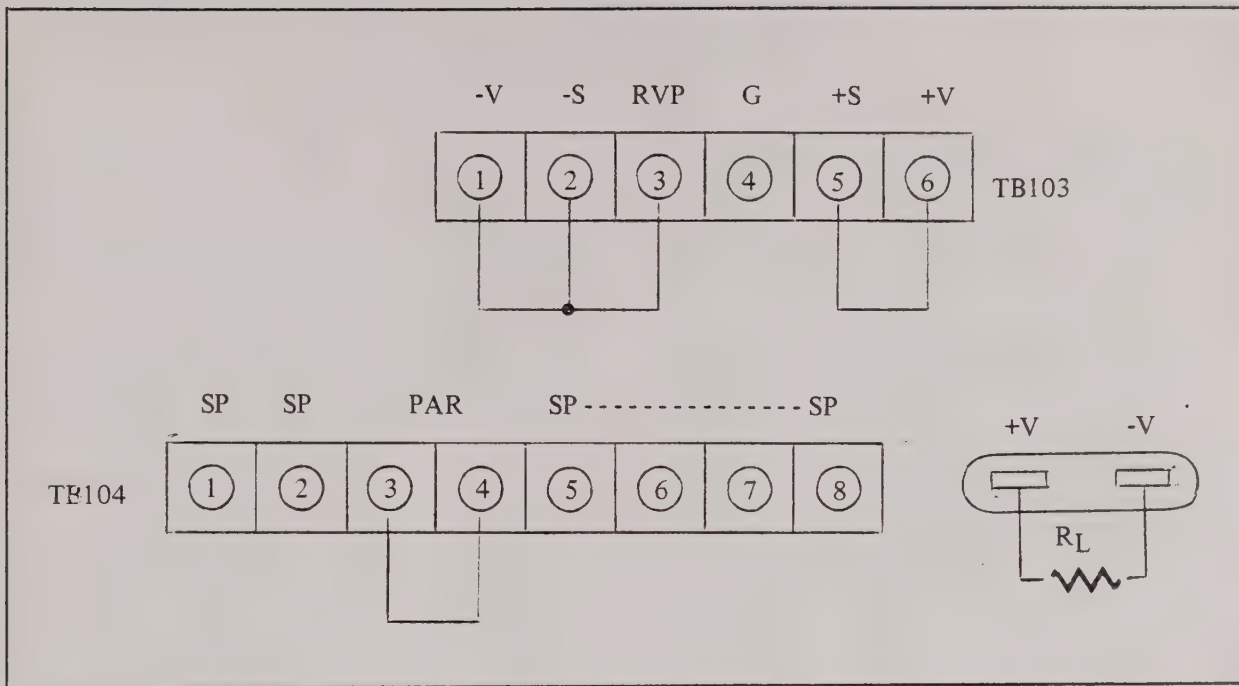


FIGURE 2-1A LOCAL PROGRAM - LOCAL SENSE VPL SERIES CONNECTIONS

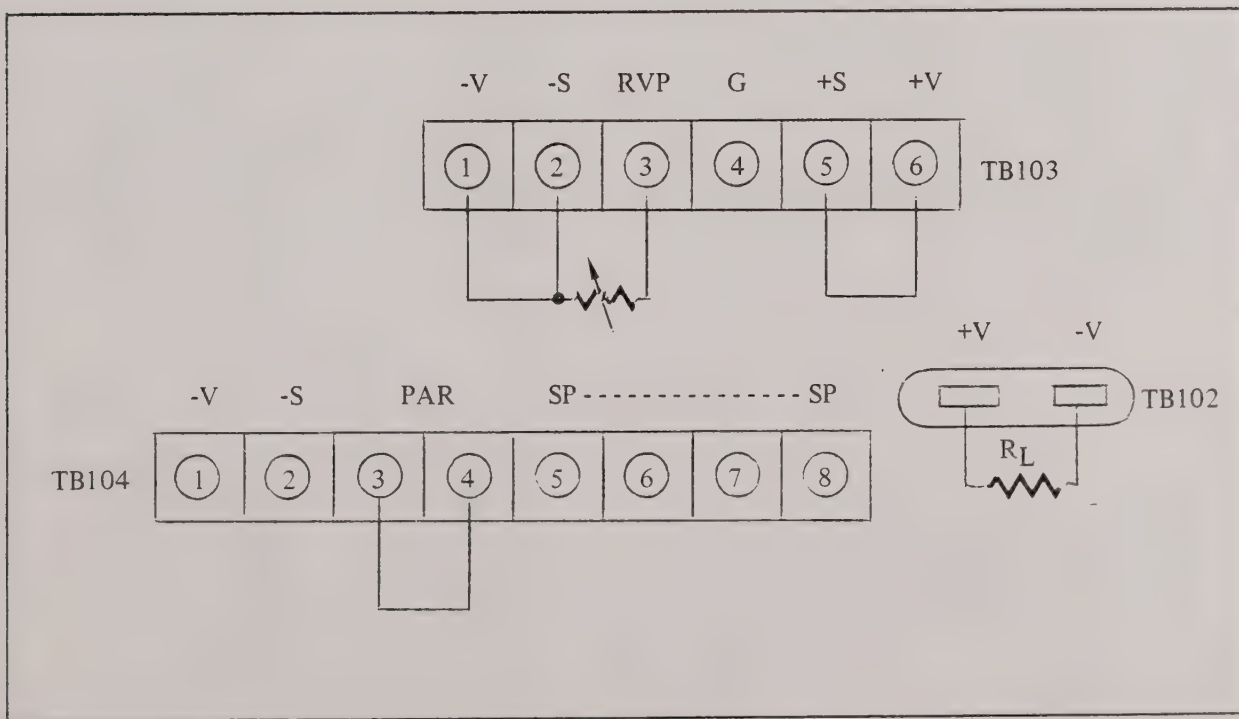


FIGURE 2-2A REMOTE PROGRAM VPL SERIES CONNECTIONS

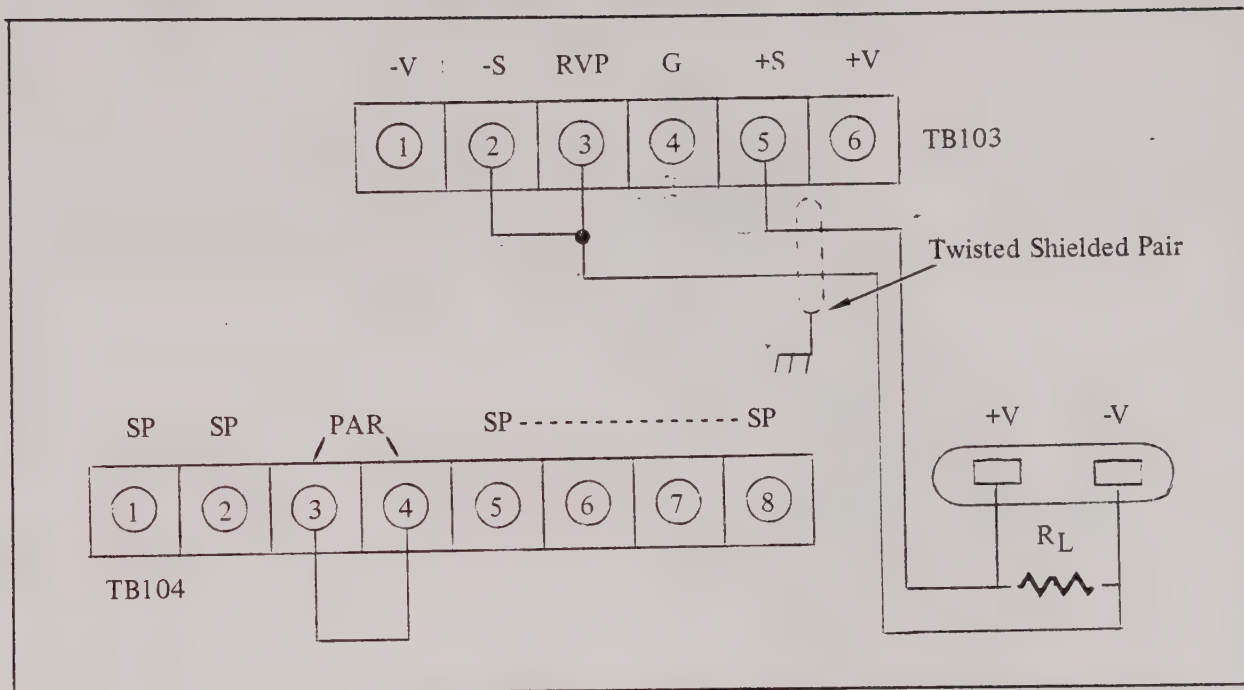


FIGURE 2-3A REMOTE SENSE VPL SERIES CONNECTION

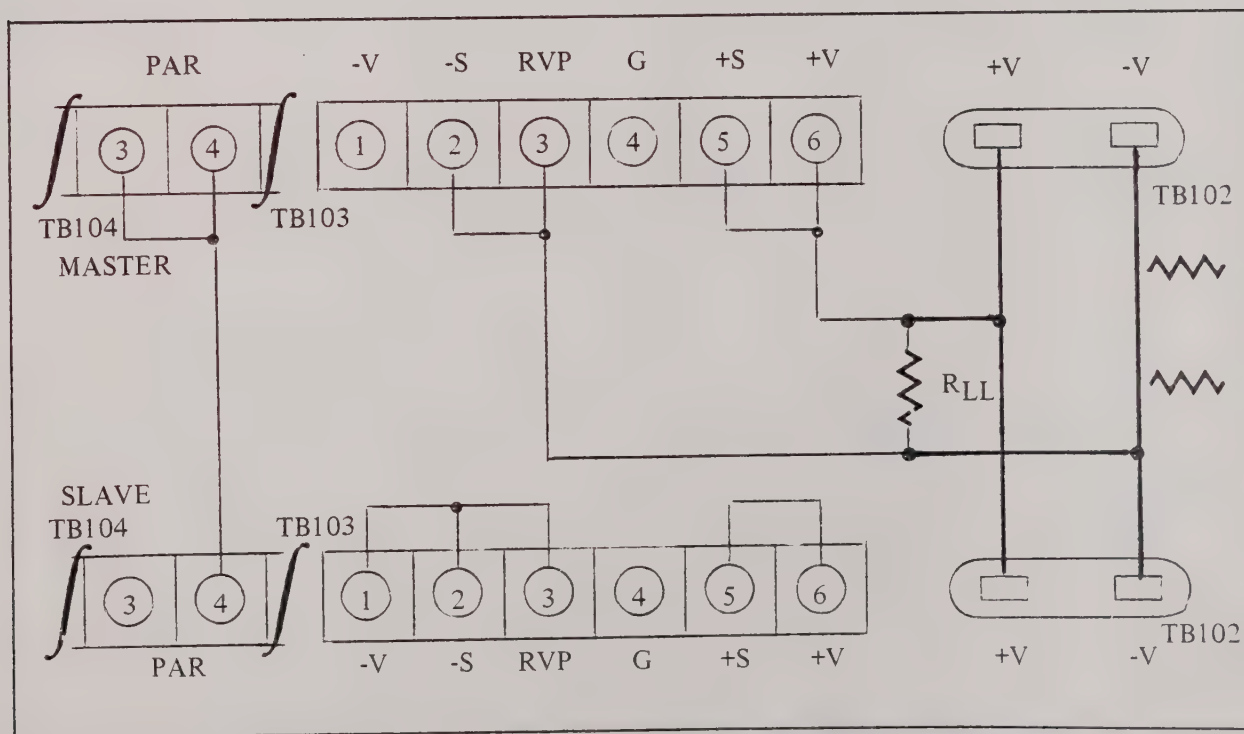


FIGURE 2-4A AUTO PARALLELING VPL SERIES CONNECTION

CHAPTER 3

THEORY OF OPERATION

3.1 GENERAL

The purpose of the ValuPower series power supplies is to transform and rectify the AC input into a well regulated, stable and adjustable DC output. The following paragraphs describe the major circuits, used in the power supply. As each circuit is described, reference should be made to both the Block Diagram, Figure 3-1 and the Schematic Diagram in the rear of this manual.

3.1.1 Primary Input

Input power is obtained through power transformers, power rectifiers, and filter capacitors. When power circuit breaker CB101 is set to ON, AC pilot lamp DS101 glows and AC power is applied to T101 and cooling fan B101. Regulated DC output voltage is immediately available from the power supply.

3.1.2 Series Regulator

The rectified voltage from CR103 and CR104 and filter capacitors C105, C106, etc., is directed through the Series Pass transistors. The conduction of these transistors is controlled by circuitry which causes them to act as variable resistors. Their overall resistance varies in accordance with the need of the power supply to increase or decrease its output voltage or current. The Series

Pass transistors are controlled by driver stages which amplify signals from the Error Amplifier.

3.1.3 Reference Supply, Comparator, Error Amplifier and Current Limiting

A single integrated circuit, A1 combines the circuitry required to perform the task usually required by many discrete components.

The stable reference voltage is generated and indicated at the circuit reference VREF. When A1 gets the Zener regulated voltage across its terminal 5 and 8, a precision voltage reference is developed across its terminals 4 and 5. A fixed sample of this voltage is fed into terminal 2 which is one input of the error amplifier.

The voltage which A1 compares the reference voltage to, is fed into terminal 3. Any change in the output voltage is automatically compensated for as the error amplifier generates a correction drive signal at terminal 6 which changes the output voltage accordingly.

Current limiting is provided by input 10 which will control the error amplifier's output when an over-current condition is present.

Terminal 9 is a compensating input to A1, to ensure stability and prevent oscillations under certain load conditions.

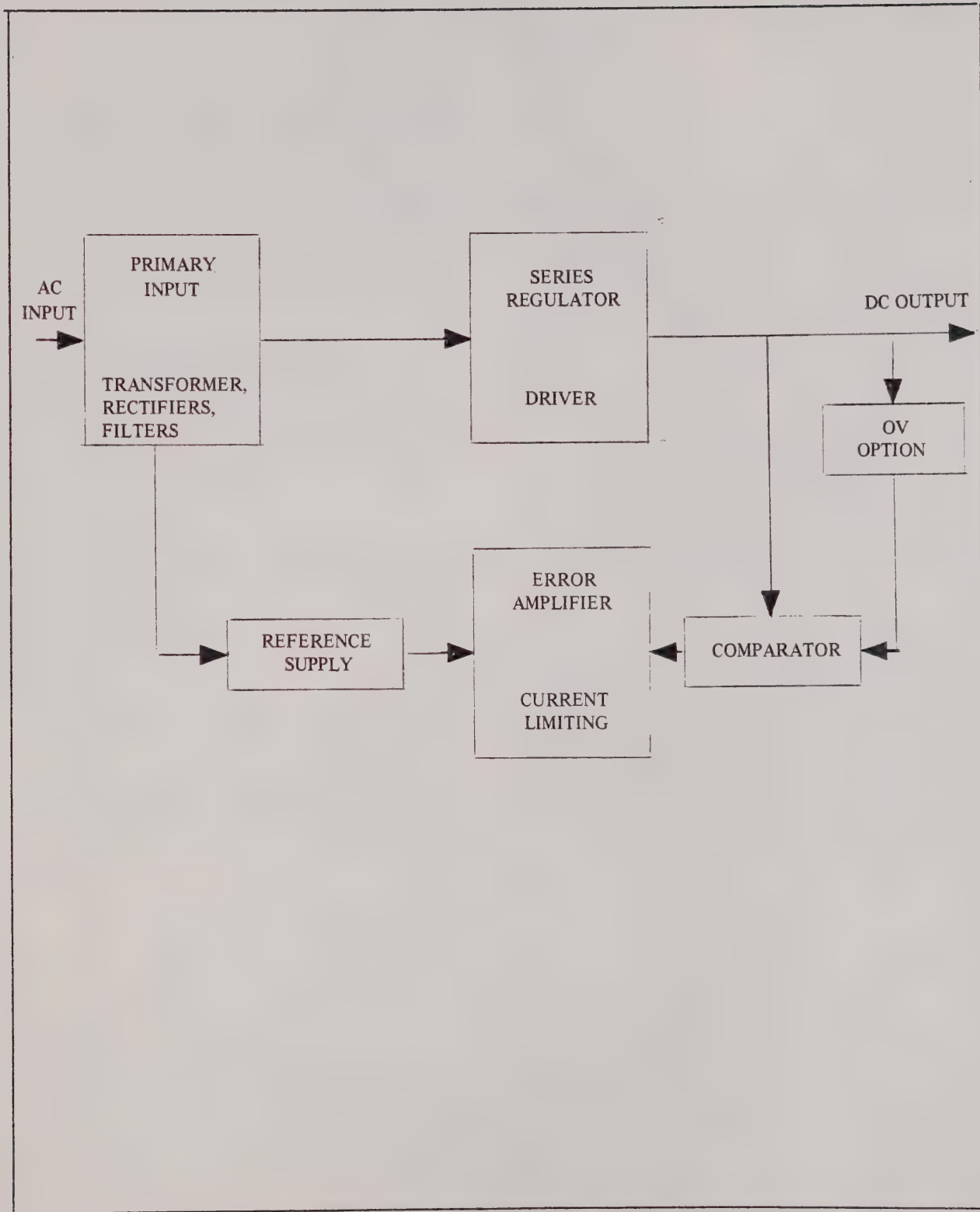


FIGURE 3-1 BLOCK DIAGRAM

CHAPTER 4

CALIBRATION AND MAINTENANCE

4.1 GENERAL

The following adjustments should be made when necessary to assure optimum operating characteristics and maximum efficiency of the ValuPower Series Power Supplies.

4.2 TEST EQUIPMENT REQUIRED (or equivalent)

1. Systron-Donner Digital Multimeter Type 9025
2. External Current Shunt (proper current rating chosen)
3. Variable Auto Transformer, 30A rating

4.2.1 Shorting Link Application

For test purposes shorting links should be connected across rear panel barrier strip terminals -V and -S, -S and RVP, +S and +V, and PAR to provide local sensing and local voltage programming operation. To reduce pickup, shielded wire must be used for all connections between test equipment and the power supply being tested. To prevent ground loops, it is important that only one ground connection be made, as shown in Figure 4-1. Tighten all terminals as securely as possible and set the Front Panel control CW.

4.3 CALIBRATION PROCEDURE

Ammeter Calibration (not required on VPL Series)

1. Using a standard ammeter in series with an external load, adjust the load so the unit will operate at its maximum rated current (as indicated on the standard ammeter) and voltage output.
2. Adjust ammeter adjust control R24 until ammeter M101 indicates the same current as the standard meter.

Current Limit Test

1. Establish nominal output voltage.
2. Set current limit control R11 fully CW.
3. Using an external load, apply a 20% current overload to the unit under test.

4. Adjust current limit control R11 until the overload, as indicated on ammeter M1, is limited to between 5% and 10% (1.05 to 1.10 maximum rated current).

Load Regulation Test - With the equipment connected as shown in Figure 4-1, connect a suitable load resistance across the output terminal connections. The load resistance selected must be able to dissipate the rated power of the unit ($P=IE$) and must be of sufficient value to yield the rated output current when the rated voltage is applied. Note the voltage indicated on the Digital Voltmeter. Disconnect the resistive load from the output.

The maximum change in output DC voltage should not exceed by more than .05% or 5 mV (whichever is greater) that of the output voltage indicated with the load resistance applied across the output terminals.

Line Regulation Test - Place the resistive load across the output and note the voltage indicated on the DVM. Vary the AC input power 10% above and below the nominal AC input level. The maximum change in output voltage should not exceed by more than $\pm 0.02\%$ or 5 mV (whichever is greater) that of the output voltage measured at either extreme of the AC input.

Ripple Voltage Test - In order to reduce pickup, shielded test leads should be used in making ripple measurements. With the resistive load connected across the output terminals, measure the AC ripple with the AC scale of the DVM. Vary the AC input power 10% above and below the nominal AC input level. The maximum ripple amplitude should not exceed 1 mV RMS and 5 mV p-p or 0.05% (whichever is greater).

Overvoltage Sensitivity (option) - The trigger point of the OV protection circuit is determined by the setting of the OV control R21, located through the top cover. To set the OV circuit to trigger within the output range of the power supply, set R21 CW. Turn on the supply and adjust it for the desired OV firing point. Turn R21 CCW until the output voltage drops as indicated by the front panel voltmeter.

To set the OV circuit to fire at higher output voltage than the output voltage of the supply, a second current limiting type power supply is needed. With the supply under test, set its output voltage to any value. Turn R21 CW and connect the second supply across its output terminals. Set the second supply's output voltage to the desired OV firing point. Turn R21 CCW until the output of the supply drops to a low value as indicated on its voltmeter. This indicates that the OV circuit has fired at the voltage set on the second power supply.

4.4 MAINTENANCE

The power supply is a precision electronic instrument. It is strongly recommended that only experienced troubleshooting personnel perform troubleshooting operations or attempt to repair the unit. If the power supply appears to be malfunctioning at all, the following procedure is recommended for isolating possible defects.

Load and Interconnections

1. Disconnect all loads and interconnections.
2. Connect a resistive load across the output terminals and operate the unit to determine whether the fault lies within the unit or externally. Observe that shorting links are in place across terminals PAR to provide local sensing operation.
3. Set input voltage to nominal value and operating controls for rated output. Satisfactory op-

eration at this time would indicate that any malfunction previously encountered, is external in nature. All interconnections and loads normally used in conjunction with this power supply should then be carefully checked for electrical defects.

Troubleshooting

1. Set Voltage Adjust and Voltage Vernier controls fully CW. Use a high impedance digital voltmeter to check the voltages across the various circuit components, if shown on the Schematic Diagram located at the rear of this instruction manual. Any sample voltages listed apply only if the unit is operating at its nominal AC input, and has a dummy load of sufficient size connected across its output to allow operation at maximum rated current and voltage output levels. Any reading which is grossly incorrect, indicates that the stage being tested or the one immediately preceding it is defective. The Block Diagram, Schematic Diagram, and appropriate sections of the Theory of Operation will prove helpful in any troubleshooting work. Proper polarity to be observed when testing can be easily obtained from the Schematic Diagram.

2. If voltage checks show no noticeable deviations from the prescribed values, disconnect AC power and proceed with point-to-point resistance checks across potentiometers, switches, diodes, resistors and transistors in that order.

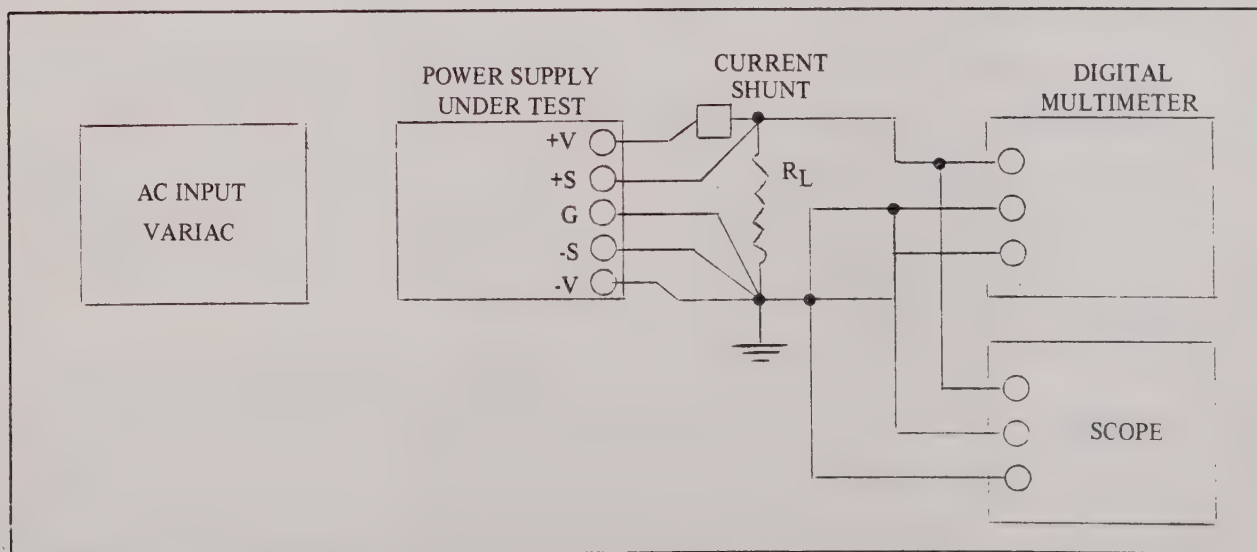


FIGURE 4-1 CONSTANT VOLT AGE OPERATION TEST EQUIPMENT SET UP

ADDENDUM FOR DUAL OUTPUT VPHD

VPHD Overvoltage Protection - The overvoltage protection provided on the dual output VPHD is one whereby the total voltage of the plus and minus outputs is sensed. The overvoltage trip point is therefore approximately twice that of each individual supply. If either supply should go high in voltage it will cause the overvoltage crowbar to clamp both the plus and minus outputs to nominal zero volts.

The trigger point of the OV protection circuit is determined by the setting of the OV control R21, located through the top cover.

To set the OV circuit to trigger within the output voltage sum of the plus and minus voltages, set R21 CW. Turn on the supply and adjust the negative output voltage (the negative output is the mas-

ter voltage with the positive output circuitry tracking automatically) for the desired OV firing point. Turn R21 CCW until the output voltage drops as indicated by the voltmeter.

To set the OV circuit to fire at a higher output voltage than the output voltages of the supply will adjust to, a second current limiting type power supply is needed.

Set the supply under test to its desired voltage with R21 turned CW. Connect the second supply across the plus and minus terminals of the supply under test and set its output voltage to the desired OV trip point. Turn R21 slowly CCW until the OV triggers as indicated by the drop in output voltage. This indicates that the OV circuit has fired at the voltage set on the second power supply.

CHAPTER 5

PARTS LIST

5.1 INTRODUCTION

This chapter contains the parts list for each assembly in the VP Series Power Supplies. Chapter 7 shows the assemblies where the listed parts are installed. Ordering information is included and should be used when purchasing parts from the factory. Expansion of the column listings and Table 5-1 Manufacturer's Code-To-Name Index are also included.

5.2 PART ORDERING INFORMATION

To order a part from the Replaceable Parts Lists, state the Systron Donner part number, and indi-

cate the quantity required and address the order to the nearest Systron Donner Sales or Service Center.

To order a part not listed in the Replaceable Parts List, state the instrument model number, instrument serial number, the description and function of the part and the number of parts required. Address the order to the nearest Systron Donner Sales or Service Center.

5.3 PARTS LIST

Each column in the parts lists provide specific information relating to the listed parts.

TABLE 5-1 MANUFACTURER'S CODE-TO-NAME INDEX

Code	Name & Address	Code	Name & Address
01121	Allen-Bradley Co. . 1201 So. 2nd Street Milwaukee, WI 53204	56289	Sprague Electronic Co. North Adams, MA 01247
02735	RCA Corp. - Solid State Division Route 202 Somerville, NJ 08876	58849	Syntron Division of FMC Corp. Homer City, PA
03877	Transitron Electronic Corp. 168 - 186 Albion Street Wakefield, MA 01880	71590	Globe-Union Inc. Centralab Electronics Division 5757 No. Green Bay Avenue Milwaukee, WI 53201
04713	Motorola Semiconductor Products Inc. 5005 E. McDowell Road Phoenix, AZ 85008	73138	Beckman Instruments Inc. Helipot Division 2500 Harbor Blvd. Fullerton, CA 92634
06540	Amatom Electronic Hardware 81 Rockdale Avenue New Rochelle, NY 10806	75042	TRW Electronic Components Fixed Resistors Philadelphia Division 401 N. Broad Street Philadelphia, PA 19108
07263	Fairchild Camera & Instrument Corp. 313 Frontage Road Mountain View, CA 94040	80294	Bourns Inc. Instrument Division 6135 Magnolia Avenue Riverside, CA 92506
14604	Elmwood Sensors Inc. 1655 Elmwood Avenue Cranston, RI 02907	81349	MIL STD
15915	Tepro of Florida Inc. 2608 Enterprise Road Dunedin, FL 33528	83330	Herman H. Smith Inc. 812 Snediker Avenue Brooklyn, NY 11207
22753	UID Electronics 4105 Pembroke Road Hollywood, FL 33021	91637	Dale Electronics Inc. P.O. Box 609 Columbus, NB 68601
27556	IMB Electronic Products Inc. 15401-E Carmenita Road Santa Fe Springs, CA 90670	91802	Industrial Devices Inc. 982 River Road Edgewater, NJ 07020
34553	Amperex Electronic Corp. Component Division 35 Hoffman Avenue Hauppauge, NY 11787	92702	IMC Magnetics Corp. Eastern Division 570 Main Street Westbury Long Island, NY 11591
52542	Systron Donner Corp. Instrument Division 2727 Systron Drive Concord, CA 94518	95987	Weckesser Co. Inc. 4444 W. Irving Park Road Chicago, IL 60641

REPLACEABLE PARTS LIST

TITLE VP SERIES SHIPPING ASSEMBLY							
ITEM	REF	USED ON	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
		1	ASSEMBLY, Front Panel	52542	PD23740	PD23740	1
		2	ASSEMBLY, Front Panel	52542	PD23815	PD23815	1
		3	ASSEMBLY, Front Panel	52542	PD23480	PD23480	1
	C113	1-3	CAPACITOR, Mylar .1 μ F, 600V	27556	ZA2G104K	106416	1
	CB1	1	BREAKER, Circuit 25A	81541		760110	1
	CB1	2,3	BREAKER, Circuit 50A	81541		760181	1
	DS101	1-3	LAMP, Pilot	91802	1040D32	770020	1
	M101	1	ASSEMBLY, Meter 150A	52542	06508101	06508101	1
	M101	2,3	ASSEMBLY, Meter 80A	52542	06504601	06504601	1
	M102	1	ASSEMBLY, Meter 6V	52542	06504102	06504102	1
	M102	2,3	ASSEMBLY, Meter 40V	52542	06507202	06507202	1
	R133	1	RESISTOR, Variable 500 Ω 10%,2W	81349	RA20NASD501A	600140	1
	R133	2	RESISTOR, Variable 2 k 10%,2W	81349	RA20NASD202A	600220	1
	R133	3	RESISTOR, Variable 2.5 k 10%,2W	81349	RA20NASD252A	600230	1
		1	NAME PLATE	52542	085710	085710	1
		3	NAME PLATE	52542	085750	085750	1
		1-3	LOCK, Shaft	83330	181	840220	1
		1-3	HANDLES	52542	T920010	T920010	1
		1-3	TEST JACK, Black	52542	T920190	T920190	1
		1-3	TEST JACK, Red	52542	T920260	T920260	1
		1-3	TEST JACK, White	52542	T920258	T920258	1
MAIN CHASSIS ASSEMBLY							
		1	ASSEMBLY, Main Chassis	52542	PD23741	PD23741	1
		2	ASSEMBLY, Main Chassis	52542	PD23861	PD23861	1
		3	ASSEMBLY, Main Chassis	52542	PD23841	PD23841	1
	B101	1-3	FAN	92702	WS2107FL	106664	1
	C103	1-3	CAPACITOR, 2.2 μ F, 250V	52542	800325	800325	1
	C104	1-3	CAPACITOR, El Can 1 μ F, 250V	52542	800304	800304	1
	C105-10	1	CAPACITOR, El Can 42000 μ F,25V	52542	820419	820419	6
	C105-10	2,3	CAPACITOR, El Can 10500 μ F,75V	52542	820325	820325	6
	C112	1-3	CAPACITOR, El Can 17500 μ F,20V	52542	820359	820359	1
	C114,115	2,3	CAPACITOR, El Can .22 μ F,250V	52542	800252	800252	2
	L101	1	CHOKE	52542	504080	504080	1
	L101	2,3	CHOKE	52542	504085	504085	1
	R134	1	RESISTOR, Shunt .006 μ F	52542	T112322	T112322	1
	R134	2,3	RESISTOR, Shunt .002 μ F	52542	T109482	T109482	1
	R135	2,3	RESISTOR, CC 2 k 5%, 5W	52542	640530	640530	1
	T101	1	TRANSFORMER	52542	504079	504079	1
	T101	2	TRANSFORMER	52542	504084	504084	1
	T101	3	TRANSFORMER	52542	504086	504086	1
		1-3	SHROUD	52542	T111894	T111894	1
		1-3	SCREW, Nylon 4-40 x 3/8	95987	N-440-3/8	102776	2

Used On Code: 1 = VP5-135 MOV 2 = VP24-60 MOV 3 = VP28-50 MOV

REPLACEABLE PARTS LIST

TITLE VP SERIES SHIPPING ASSEMBLY (Cont'd)							
ITEM	REF	USED ON	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
		1-3	BRACKET, Cap	52542	T900111	T900111	1
		1-3	PLATE, Insulator	52542	T109932	T109932	1
		1-3	NUT, Nylon	52542	T990400	T990400	3
		1-3	FEET, Rubber	52542	840192	840192	4
		1-3	BUS	52542	T109902	T109902	1
		1-3	BUS, Positive Output	52542	T109462	T109462	1
		1-3	BUS, Negative Output	52542	T109452	T109452	1
		1-3	BUS, Diode Positive	52542	T111852	T111852	1
		1-3	SUPPORT, PC Board	52542	117333	117333	4
		1-3	CLAMP, Cap	52542	T109272	T109272	1
		1-3	BRACKET, Blower	52542	057020	057020	2
			SUB-CHASSIS ASSEMBLY				
		1	ASSEMBLY, Sub-Chassis	52542	PD23736	PD23736	1
		2	ASSEMBLY, Sub-Chassis	52542	PD23811	PD23811	1
		3	ASSEMBLY, Sub-Chassis	52542	PD23816	PD23816	1
		1-3	CHASSIS, Sub	52542	T109942	T109942	1
	C101,02	1-3	CAPACITOR, MF .1 μ F,250V	52763	MKT1813-410/25	800185	2
	C111	1	CAPACITOR, El Can 35000 μ F,20V	52542	820403	820403	1
	C111	2,3	CAPACITOR, El Can 20000 μ F,35V	52542	820366	820366	1
	CR101,02	2,3	DIODE, Rectifier	04713	MR1120	720129	2
		1-3	CLAMP, Cap	52542	T100712	T100712	1
		1-3	STANDOFF, Ceramic	52542	860055	860055	2
		1-3	BRACKET, Angle	52542	T900003	T900003	2
		1-3	NUT, Nylon	52542	T990405	T990405	4
		1-3	CONNECTOR	52542	T109862	T109862	1
		1-3	LUG	52542	T960085	T960085	2
			HEATSINK ASSEMBLY #1				
		1	ASSEMBLY, Heatsink	52542	PD23733	PD23733	1
		2	ASSEMBLY, Heatsink	52542	PD23808	PD23808	1
		3	ASSEMBLY, Heatsink	52542	PD23833	PD23833	1
		1-3	HEATSINK	52542	T109912	T109912	1
	Q119-30	1	TRANSISTOR, Selected	52542	705076	705076	12
	Q120,21, 23,24,25, 27,28,30	2,3	TRANSISTOR, SINPN	02735	2N6258	700088	8
	R119-30	1	RESISTOR, WW .1 Ω 3%, 5W	15915	TSA5	630018	12
	R120,21, 23,-25,27 28,30	2,3	RESISTOR, WW .3 Ω 3%, 5W	15915	TSA5	630027	8
		1-3	BUS	52542	T109882	T109882	1
		1	SOCKET, Transistor	22753	PTS-2	830101	12
		2,3	SOCKET, Transistor	22753	PTS-2	830101	8
		1-3	NUT, Nylon	52542	T990405	T990405	1

Used On Code: 1 = VP5-135 MOV 2 = VP24-60 MOV 3 = VP28-50 MOV

REPLACEABLE PARTS LIST

TITLE VP SERIES SHIPPING ASSEMBLY (Cont'd)							
ITEM	REF	USED ON	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
			HEATSINK ASSEMBLY #2				
		1	ASSEMBLY, Heatsink	52542	PD23734	PD23734	1
		2	ASSEMBLY, Heatsink	52542	PD23809	PD23809	1
		3	ASSEMBLY, Heatsink	52542	PD23834	PD23834	1
		1-3	HEATSINK	52542	T109912	T109912	1
	C101-02	1	CAPACITOR, MF .1 μ F 10%, 250V	52763	MKT1813-410/25	800185	2
	CR101,02	1	DIODE, Rectifier 100V	04713	1N1200RA	725057	2
	CR109	2,3	DIODE, Rectifier 400V	04713	1N5395	100413	1
	Q108-18	1	TRANSISTOR, Selected SINPN	52542	705071	705071	11
	Q108-11, 14,16,18	2,3	TRANSISTOR, SINPN	02735	2N6258	700088	7
	R108-18	1	RESISTOR, WW .1 Ω 3%, 3W	15915	TSA5	630018	11
	R108-11, 14,16,18	2,3	RESISTOR, WW .3 Ω 3%, 5W	15915	TSA5	630027	7
	R132	1-3	RESISTOR, WW 10 Ω 10%, 2W	75042	BWH	640190	1
		1-3	BUS	52542	T109882	T109882	1
		1-3	SOCKET, Transistor	22753	PTS-2	830101	11
		1-3	NUT, Nylon	52542	T990405	T990405	1
			HEATSINK ASSEMBLY #3				
		1	ASSEMBLY, Heatsink	52542	PD23735	PD23735	1
		2	ASSEMBLY, Heatsink	52542	PD23810	PD23810	1
		3	ASSEMBLY, Heatsink	52542	PD23835	PD23835	1
		1-3	HEATSINK	52542	T109922	T109922	1
	CR103,04	1-3	DIODE, Rectifier 100V	58849	S4110+SPEC	725089	2
	CR108	1-3	DIODE, Rectifier 100V	04713	1N1184A	720335	1
	Q101,02, 04-07	1	TRANSISTOR, SINPN Selected	52542	705071	705071	6
	Q101,02, 05,07	2,3	TRANSISTOR, SINPN	02735	2N6258	700088	4
	Q103	1	TRANSISTOR, SINPN	04713	2N4912	700196	1
	Q103	2,3	TRANSISTOR, SINPN	04713	2N3738	102738	1
	R101,02 04-07	1	RESISTOR, WW .1 Ω 3%, 5%	15915	TSA5	630018	6
	R101,02	2,3	RESISTOR, WW .47 Ω 10%, 2W	75042	BWH	640069	2
	R103	1-3	RESISTOR, CC 1 k 10%, 1/2W	01121	EB1025	101467	1
	R105,07	2,3	RESISTOR, WW .3 Ω 3%, 5W	15915	TSA5	630027	2
	R131	1-3	RESISTOR, CC 100 Ω 10%, 1/2W	01121	EB1015	101498	1
	S101	1-3	SWITCH, Thermal	14604	2450-88-32	880003	1
		1	SOCKET, Transistor	22753	PTS-2	830101	6
		2,3	SOCKET, Transistor	22753	PTS-2	830101	4
		1-3	SOCKET, Transistor	22753	PTS-2	830103	1
		2	CLAMP	52542	T930187	T930187	2
		1-3	BUS	52542	T109882	T109882	1
		1-3	STANDOFF	06540	8211-8-632-3A	860070	2

Used On Code: 1 = VP5-135 MOV 2 = VP24-60 MOV 3 = VP28-50 MOV

REPLACEABLE PARTS LIST

TITLE VP SERIES SHIPPING ASSEMBLY (Cont'd)							
ITEM	REF	USED ON	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
			DIODE BRACKET ASSEMBLY				
		1	ASSEMBLY, Diode Bracket	52542	PD23860	PD23860	1
		2	ASSEMBLY, Diode Bracket	52542	PD23856	PD23856	1
		3	ASSEMBLY, Diode Bracket	52542	PD23854	PD23854	1
		1-3	BRACKET	52542	T109442	T109442	1
	CR106	1-3	DIODE, SCR	58849	70C050IL	720047	1
	CR107	1-3	DIODE, Rectifier	04713	41HF10	720335	1
			REAR CHASSIS ASSEMBLY				
		1	ASSEMBLY, Rear Chassis	52542	PD23739	PD23739	1
		2	ASSEMBLY, Rear Chassis	52542	PD23814	PD23814	1
		3	ASSEMBLY, Rear Chassis	52542	PD23839	PD23839	1
		1-3	INSULATOR, Output	52542	T109472	T109472	1
		1-3	COVER, AC	52542	081468	081468	1
		1-3	BARRIER STRIP	52542	850039	850039	1
		1-3	BARRIER STRIP	52542	851303	851303	1
		1-3	SPACER, Hex 1/2"	52542	860100	860100	2
		1-3	NAME PLATE	52542	T101040	T101040	1
		1-3	LINK	52542	840217	840217	4
			PC BOARD ASSEMBLY				
		1	ASSEMBLY, PC Board	52542	PD23730	PD23730	1
		2	ASSEMBLY, PC Board	52542	PD23805	PD23805	1
		3	ASSEMBLY, PC Board	52542	PD23830	PD23830	1
		1-3	BOARD, PC	52542	112256	112256	1
	A1	1-3	IC, Voltage Regulator	04713	MC1723	025756	1
	C1	1-3	CAPACITOR, El Ax 100 μ F, 50V	34553	C437AR/H100	102598	1
	C3,8	1-3	CAPACITOR, Ceramic .01 μ F,600V	71590	DD6-103	800090	2
	C4	1-3	CAPACITOR, DM 470 pF	52542	800002	800002	1
	C5,6	1-3	CAPACITOR, El Ax 35 μ F, 25V	56289	40D35600250C4	810060	2
	C7	1-3	CAPACITOR, Ceramic .05 μ F,200V	56289	TGS50	100134	1
	C9	1-3	CAPACITOR, Ceramic .1 μ F,100V	56289	5C023104X0500C4	100178	1
	C11	1-3	CAPACITOR, Tant 68 μ F, 15V	56289	196D686X0015PE4	821006	1
	C12	1-3	CAPACITOR, Tant 10 μ F, 25V	56289	150D106X9020B2	100063	1
	C13	1	CAPACITOR, Tant 200 μ F, 25V	52542	810161	810161	1
	C13	2,3	CAPACITOR, Tant 50 μ F, 50V	52542	810072	810072	1
	CR1,2,6, 7,12,13	1-3	DIODE, Rectifier 400V	04713	1N5395	100413	6
	CR3	1-3	DIODE, Zener 11V	04713	1N4741A	720410	1
	CR4	1-3	DIODE, Zener 5.1V	03877	1N753A	100387	1
	CR5	1	DIODE, Rectifier	04713	1N747A	100469	1
	CR5,10	2,3	DIODE, Zener	03877	1N751A	100378	2
	CR8	1	DIODE, Zener	03877	1N746A	100415	1
	CR9	1-3	DIODE, SCR	04713	2N4990	741001	1

Used On Code: 1 = VP5-135 MOV 2 = VP24-60 MOV 3 = VP28-50 MOV

REPLACEABLE PARTS LIST

TITLE VP SERIES SHIPPING ASSEMBLY (Cont'd)							
ITEM	REF	USED ON	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	CR10	1	DIODE, Zener	03877	1N751A	100378	1
	CR11	1-3	DIODE, Signal	04713	1N4148	720440	1
	Q1	1-3	TRANSISTOR, SINPN	07263	2N2219A	106587	1
	R1	1	RESISTOR, WW 200 Ω 5%, 5W	75042	BWH	640389	1
	R1	2,3	RESISTOR, WW 470 Ω 10%, 2W	75042	BWH	640440	1
	R2	1-3	RESISTOR, Variable 500 Ω , 1/2W	73138	72PR500	600133	1
	R3	1-3	RESISTOR, Variable 2 k 10%, 1/2W	80294	3380P1203	600207	1
	R4	1-3	RESISTOR, MF 2.26 k 1%, 1/2W	81349	RN65D2261F	620436	1
	R5	1	RESISTOR, MF 3.4 k 1%, 1/2W	81349	RN65D3401F	620488	1
	R5	2	RESISTOR, MF 12.4 k 1%, 1/2W	91637	MFF 1/4 T1	102201	1
	R5	3	RESISTOR, MF 13.7 k 1%, 1/2W	81349	RN65D1372F	620634	1
	R6	1-3	RESISTOR, MF 4.64 k 1%, 1/2W	81349	RN65D4641F	620534	1
	R7	1-3	RESISTOR, MF 1.96 k 1%, 1/2W	81349	RN65D1961F	620402	1
	R8,14	1-3	RESISTOR, CC 2.2 Ω 5%, 1/2W	01121	EB2205	106012	2
	R11,16, 21,24	1-3	RESISTOR, Variable 100 Ω , 1/2W	73138	72PR100	117188	4
	R12	1	RESISTOR, CC 680 Ω 5%, 1/2W	01121	EB6815	101475	1
	R12,32	2	RESISTOR, CC 2.2 k 5%, 1/2W	01121	EB2225	101454	2
	R12,13	3	RESISTOR, CC 3.3 k 5%, 1/2W	01121	EB3325	101432	2
	R13	2	RESISTOR, CC 150 Ω 5%, 1/2W	01121	EB1515	101527	1
	R13	3	RESISTOR, CC 1.2 k 5%, 1/2W	01121	EB1225	101455	1
	R15	1	RESISTOR, WW 400 Ω 5%, 5W	75042	BWH	640434	1
	R15	2,3	RESISTOR, WW 2.5 k 3%, 3W	15915	TS3 2.5k 3%	630450	1
	R17,18	1	RESISTOR, WW 7.5 Ω 10%, 10W	75042	BWH	640182	2
	R17,18	2,3	RESISTOR, WW 250 Ω 10%, 10W	75042	BWH	640400	2
	R19	1	RESISTOR, WW 20 Ω 5%, 5W	75042	BWH	640250	1
	R19	2,3	RESISTOR, WW 200 Ω 5%, 5W	75042	BWH	640389	1
	R20	1	RESISTOR, WW 3.3 Ω 5%, 2W	75042	BWH	640140	1
	R20	2,3	RESISTOR, WW 47 Ω 10%, 2W	75042	IRC	640280	1
	R22	1-3	RESISTOR, CC 1.5 k 5%, 1/2W	01121	EB1525	101459	1
	R23,24	1-3	RESISTOR, CC 1 k 5%, 1/2W	01121	EB1025	101467	2
	R26	1	RESISTOR, CC 2.2 M 10%, 1/2W	01121	EB2251	611100	1
	R27,31	1-3	RESISTOR, CC 4.7 k 5%, 1/2W	01121	EB4725	101511	2
	R28	1-3	RESISTOR, CC 6.8 k 5%, 1/2W	01121	EB6825	101510	1
	R30	1-3	RESISTOR, CC 220 Ω 5%, 1/2W	01121	EB2215	101667	1
	R32	1,3	RESISTOR, CC 2.2 k 5%, 1/2W	01121	EB2225	101454	1

Used On Code: 1 = VP5-135 MOV 2 = VP24-60 MOV 3 = VP28-50 MOV

CHAPTER 6

DRAWINGS

6.1 INTRODUCTION

This chapter contains the schematic drawings for the VP Series ValuPower Supplies. These diagrams

relate to the circuit details described throughout this manual. The parts lists contained in Chapter 5 relate to the reference designation and item call-outs on the diagrams.

The diagram illustrates a 208-240V power supply system. It begins with a transformer T101, which has a primary winding connected to a 208-240V power table. The secondary windings provide 115V, 208/220V, and 230/240V outputs. The 230/240V output is connected to a bridge rectifier (DS101, B101) and a filter capacitor (C101, 1MFD, 250V). The rectified output is then connected to a series of diodes (CR101, CR102, CR103, CR104) and a protective thermal switch (S101, 8800003). The circuit also includes a current balancer (R2, 500Ω, CW) and a 741 op-amp (A1, MAT-23C) for regulation. Various resistors (R101, R102, R103, R31, R3) and capacitors (C102, C112, C103, C104, C1, C8) are shown with their respective values and ratings. The diagram is divided into sections for 'DRIVERS', 'CIRCUIT BOARD', and '208-240V POWER TABLE'.

208-240V POWER TABLE

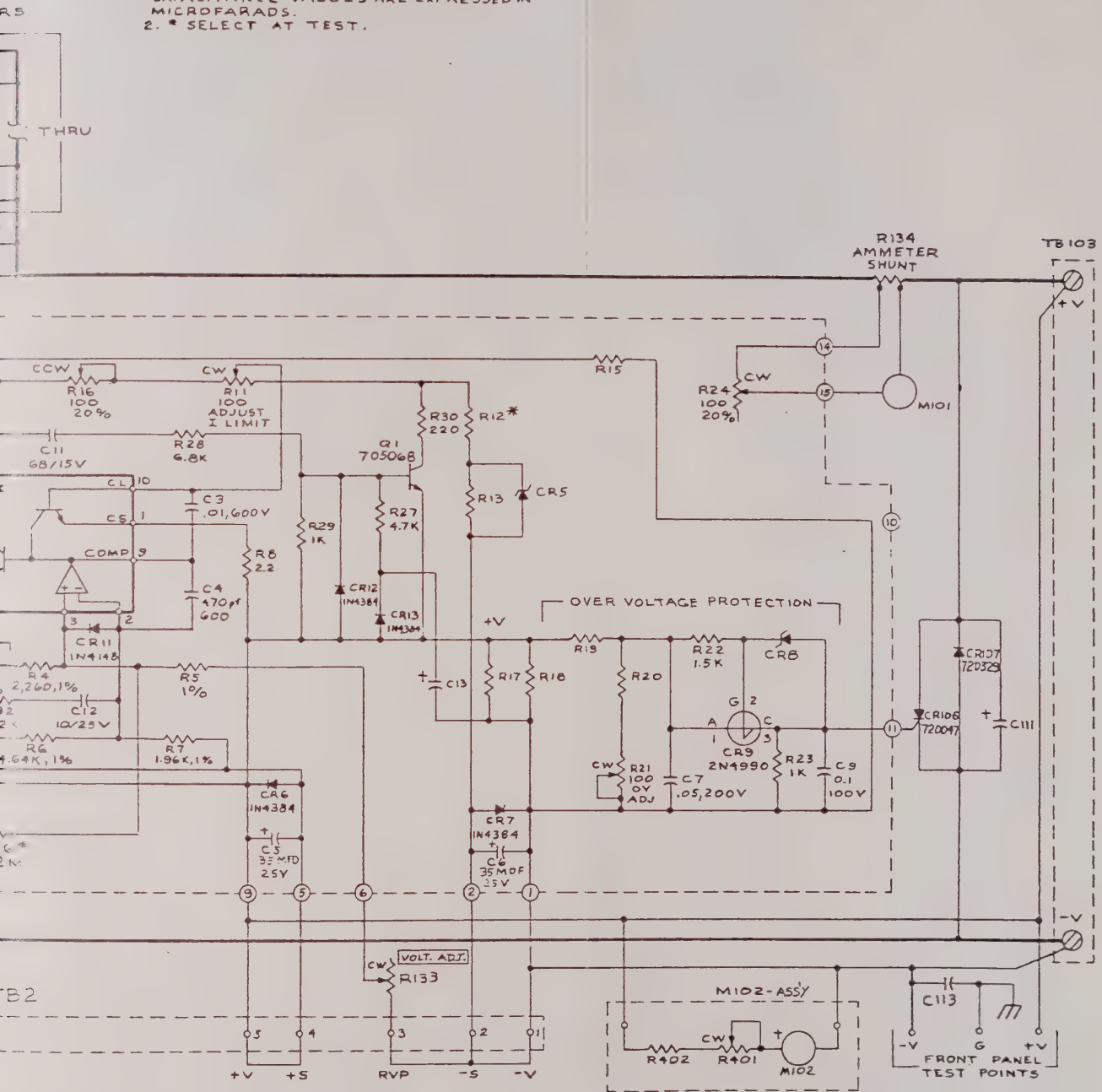
Input	Output	Rating
208	240	115V
220	240	115V
230	240	115V

MODEL	T101
VP-5-135	504089
VP12-90	504107
VP15-85	
VP8-115	

CIRCUIT BOARD COMPONENT TABLE

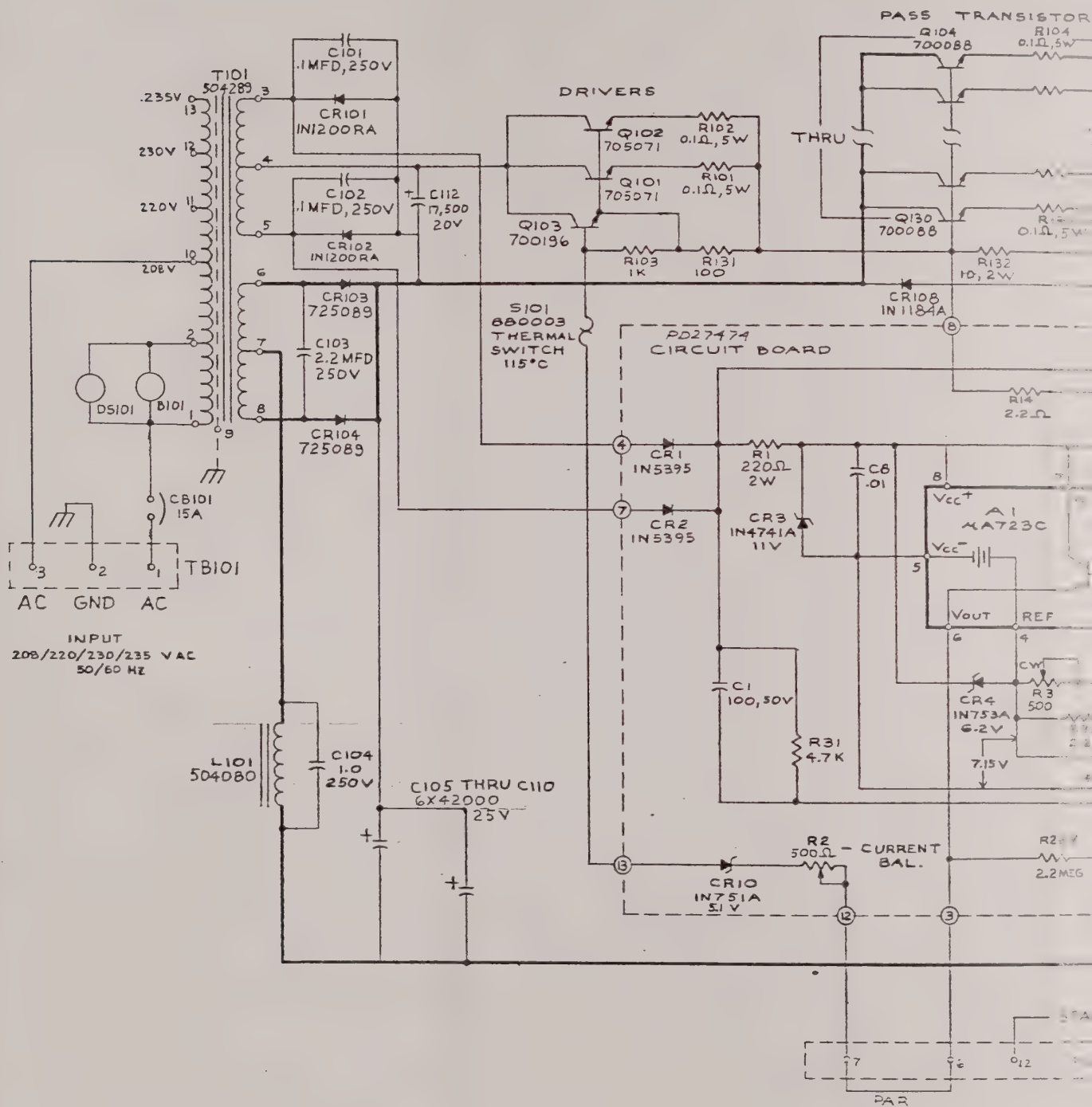
1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509
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NOTES:
 UNLESS OTHERWISE SPECIFIED,
 ALL RESISTORS ARE 1/2 WATT, $\pm 10\%$
 RESISTOR VALUES ARE EXPRESSED IN OHMS
 CAPACITANCE VALUES ARE EXPRESSED IN
 MICROFARADS.
 2. * SELECT AT TEST.



504080	504131	OMIT
504082	504083	.01 μ F 600V
504082	504081	OMIT
504080	504079	OMIT
L101	T101	C113

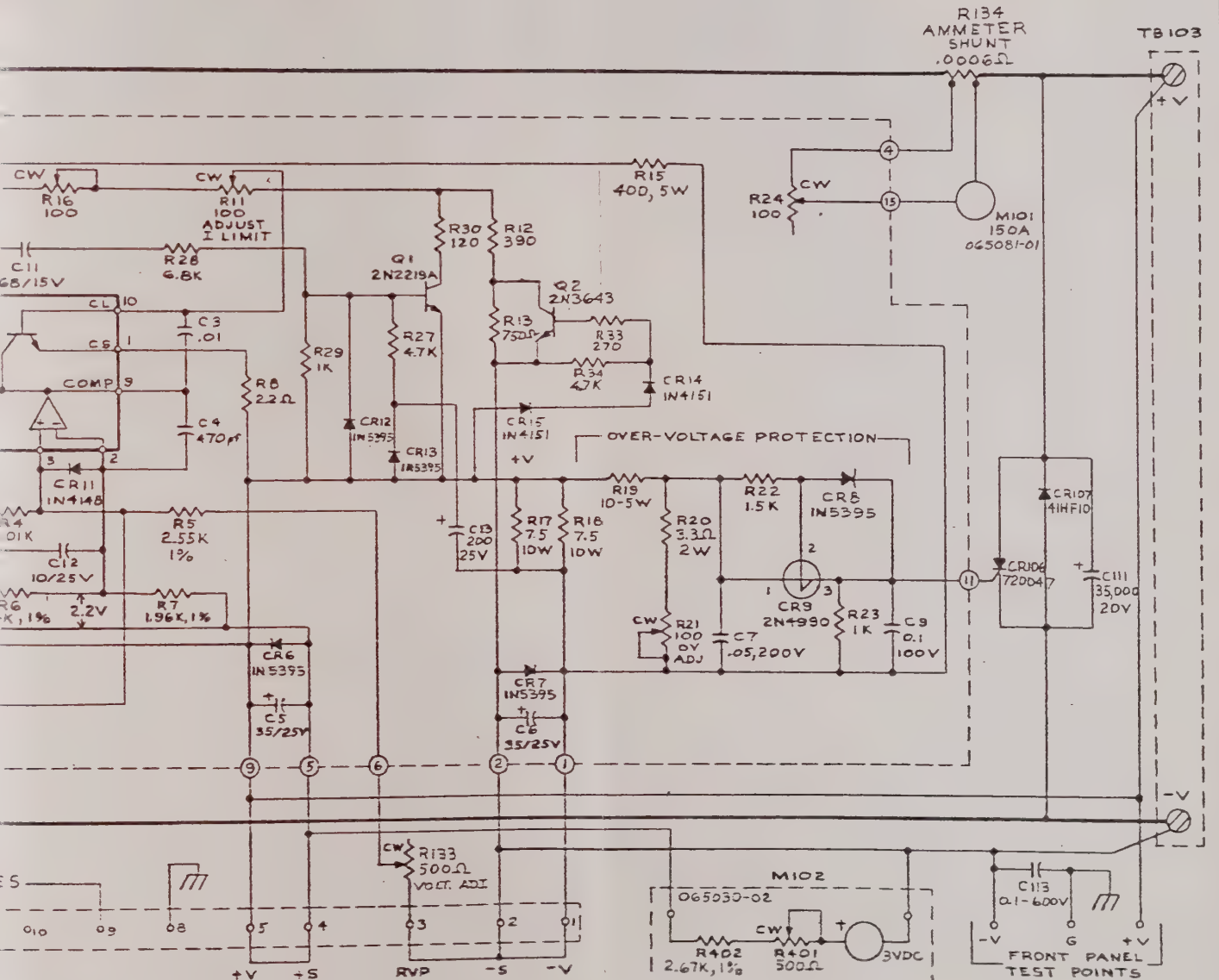
MODEL VP5-135 MOV
 SCHEMATIC #065153 Rev E



NOTES:
UNLESS OTHERWISE SPECIFIED.
ALL RESISTOR ARE 1/2 WATT, $\pm 5\%$
RESISTOR VALUES ARE EXPRESSED IN OHMS
CAPACITANCE VALUES ARE EXPRESSED IN
MICROFARADS.
2. * SELECT AT TEST.

REV.	DESCRIPTION	REV. NO.	REV. NO.	DATE	APP. P.
A	DELETED TB104			5-7-73	AS
B	CR108 WAS P/N 720488			6-11-73	AS
D	IN5393S BEC IN5394, TB104 DELETED. (5 WATT PL)			NFC	15-6-85/AT/S

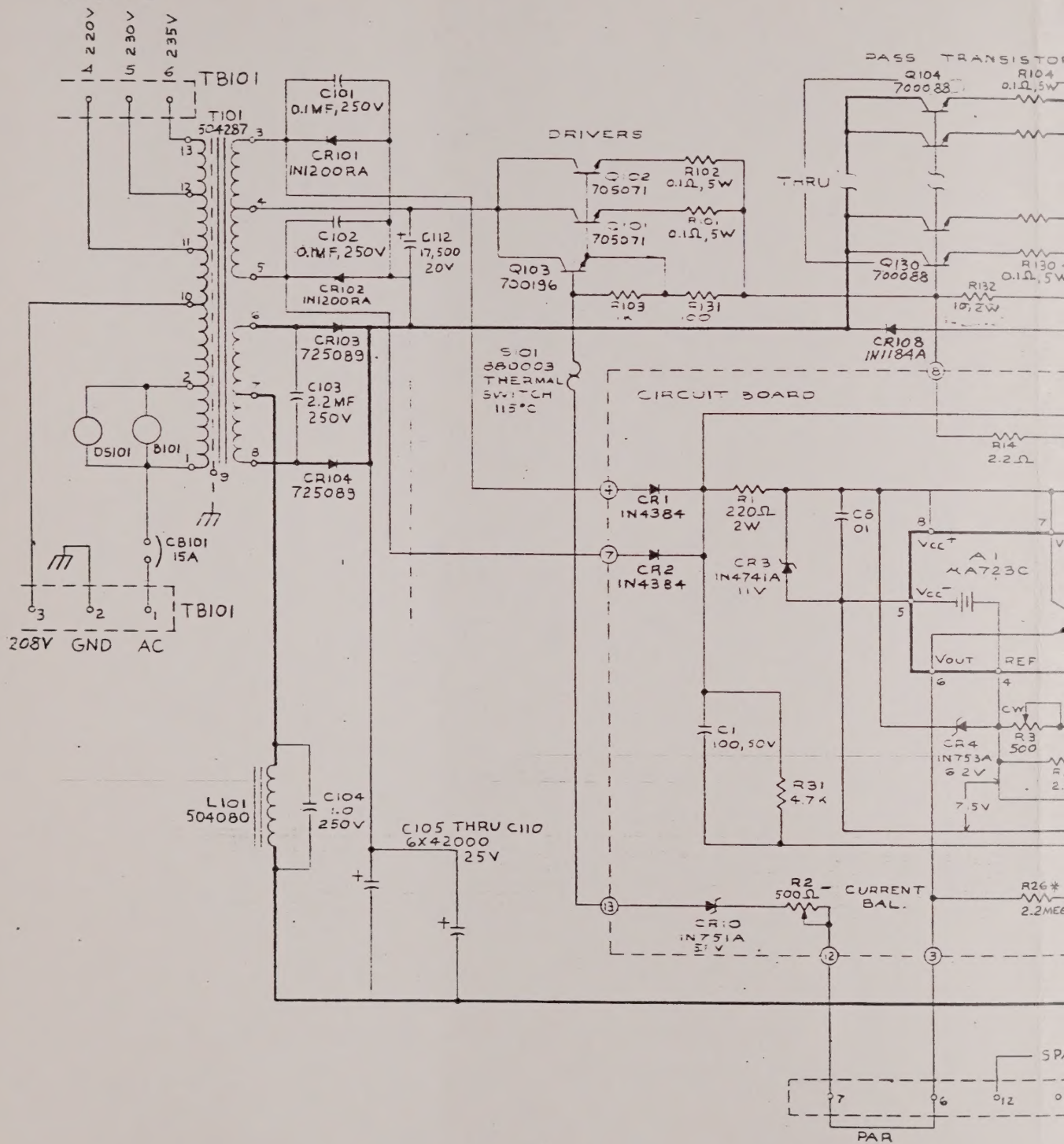
THRU



ITEM NO.	QTY	PART NUMBER	DESCRIPTION	REWORKING REF. NO.
LIST OF MATERIALS				
DRAWN C. BROWN DATE ATE	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMAL TOLERANCE DATE DATE DATE DATE	SYSTRON  DONNERS CORPORATION CONCORD, CALIFORNIA CODE IDENT 52542	MODEL VPE-100 36498	
SCALE	DRAWING	MATERIAL	DRAWING NO.	REV.

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INPUT
208/220/230/235 VAC
50/60 HZ

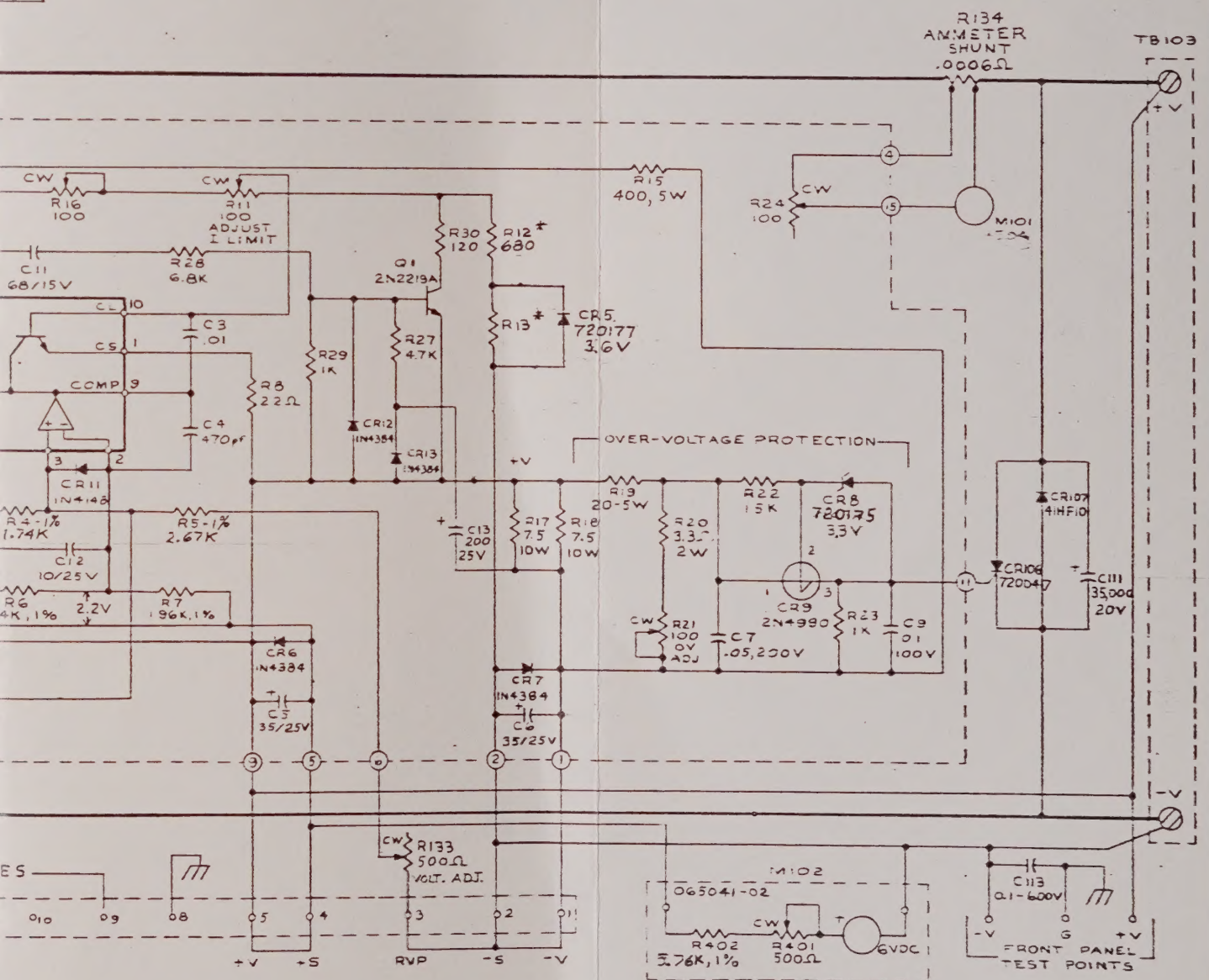


VP5-100-S6494A	150A
VP5-135-S6494	150A
VP5.2-150-S6523	200A
MODEL	M-101

2. * SELECT AT TEST

LEYSUNG					
NO.	DESCRIPTION	REL. NO.	REL. NO.	DATE	APP. P.
A	DELETED TB104			5-2-78	R18
B	CR 08 WAS PIN 720488			5/20/78	R18
C	R3 WAS 2K, R4 WAS 2.7G (2.0K IN 56494) R5 " 3.4K (3.01K IN 56494)			5/29/78	R18

THRU



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DRAWN <u>DATE</u> CHECK <u>DATE</u> ELECT <u>DATE</u> WELD <u>DATE</u> PROJECT <u>DATE</u> I/A <u>DATE</u>		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMAL TOLERANCE .XXX .XXX .XXX		SYSTRON  CONNOR CORPORATION CONCORD CALIFORNIA CODE IDENT 52542		VP5-135-S6494 VP5-100-S6494A VP5-2-150-S6523	
USED ON _____ NEXT TEST _____ APPLICATION _____		S/WALL _____ DO NOT SCALE DRAWING _____		MATERIAL _____ _____ _____		DRAWING NO. REVIS. 21 PART NO. 065135	

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